THE AMERICAN GAS LIGHT JOURNAL

REDMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXXI. No. 3. Whole No. 1,519. | NEW YORK, MONDAY, JULY 18, 1904. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $5 (£1—25 francs). All payments to be made in advance. Single copies, 10 cents.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them.

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

Collections are invariably made directly from this office for subscriptions advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL NOTICE—

Where to Find the Western Gas Association's Exhibit and the Custodian Thereof at the World's Fair 81

NOTICE—

Twelfth Annual Meeting, Pacific Coast Gas Association 81

EDITORIALS—

Briefly Told 82

Books Recently to Hand—Notes.

CORRESPONDENCE—

We Believe Credit was Given to Mr. Egner in the Detailed Report of the Librarian 82

Twenty-seventh Annual Meeting, Western Gas Association—Official Report—Revised by the Secretary—Concluded from Page 47 82

Afternoon Session—*Coal Projectors, by Mr. F. H. Shelton—Discussion—Report on the Work Performed by President Shelton Respecting the Gas Exhibit at the Fair—*The Wrinkle Department—Discussion—Resignation of Editor Steinwedell—Preliminary Vote of Thanks—Election of Officers—Some Responses—Proposing a Change in Election Policy—The Ventilation of Gas Retort Houses, by Mr. Alfred Lotz—New Members Elected—Roll Call—Adjourned.

*Contents of the Question Box, Twentieth Annual Meeting, Ohio Gas Light Association—Continued from Page 50 88

Proceedings of the Congress of Gas Associations of America—As Furnished by the Secretary 89

First Day, June 15—Morning Session—Opening Address, by Mr. Rollin Norris—Preliminary Action Taken Thereon.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES 92

Return of Mr. A. C Anderson—Another Issue of Stock by the Boston Edison Company—Mr. R. H. Lawlor Goes to East St Louis, Ills.—The New York and Queens County Gas Company—Annual Meeting, Milwaukee, Wis.—Some New Jersey Official Resolutions—Good-bye to the Addicks Oxy-Hydrogen Gas Company, Wilmington, Del.—The Boise City (Idaho) Company in Operation—May Issue New Stock—Changes at Quincy, Ills.—Cheaper Gas for Milwaukee, Wis.—Personal—The Hamburg (Pa.) Plant Completed—Annual Meeting, Louisville, Ky.—Death of Mr. A. S. Peirce—And Other Items.

The Market for Gas Securities 94

[OFFICIAL NOTICE.]

Where to Find the Western Gas Association's Exhibit, and the Custodian Thereof, at the World's Fair.

To the Fraternity: The exhibit of the Western Gas Association, at the World's Fair, St. Louis, is located in Section 33A, Liberal Arts Building, where Mr. Fred. R. Persons, who is in charge of the same, will always be on hand to receive visitors and to explain anything that requires explaining.

[NOTICE.]

Twelfth Annual Meeting, Pacific Coast Gas Association.

SAN FRANCISCO, CAL., June 6th, 1904.

To the Members of the Pacific Coast Gas Association: The Twelfth Annual Meeting of the Pacific Coast Gas Association will be held in the city of San Francisco, Tuesday and Wednesday, July 18th and 19th, 1904, and will be called to order at 10 A.M., Tuesday, by Mr. W. A. Aldrich, President. Place of meeting, Assembly Hall, Mechanics' Library, Post street, between Montgomery and Kearny.

The meeting of the Directors will be held Monday, July 17th, 1904, at 8 P.M., at the office of the Secretary, 427 Rialto Building, corner New Montgomery and Mission streets.

The following papers will be read:

President's Address, by Mr. W. A. Aldrich.

"Benefits of Consolidation," by Mr. John Martin.

"Some Practical Observations on the Flow of Gases in Pipes," by Mr. L. P. Lowe.

"Auld Lang Syne," by Mr. T. R. Parker.

"Notes Regarding California Petroleum," by Mr. P. W. Prutzman.

"Pressure Points," by Mr. E. C. Jones.

"From a Consumer's Standpoint," by Mr. John A. Britton.

"Effective Steam Plants for Gas Manufacture," by Mr. C. H. Pennoyer.

"American vs. English Gas Cooking Stoves," by Messrs. A. S. Main, Glasgow, Scotland; C. S. Barbour, London, England; H. Trenkamp, Cleveland, O.

"Wrinkles," edited by Mr. R. P. Valentine.

"Experiences," edited by Mr. Geo. S. Colquhoun.

"Novelty Department," edited by Mr. Geo. H. Hollidge.

"Question Box."

The annual banquet will be held Wednesday, July 19th, at 7 P.M.

The annual outing, for members, their families and friends, to Alum Rock, Santa Clara county, is set for Thursday, July 20th, particulars of which will be announced at meeting.

Arrangements have been made for a lecture on "Radium," to be given Tuesday evening, July 18th, by Prof. Edward Booth, of the University of California, to which members and their families will be admitted.

JOHN A. BRITTON,
Secretary.

LIBRARY OF CONGRESS
JUL 18 1904

BRIEFLY TOLD.

BOOKS RECENTLY TO HAND.—Recent welcome additions to our bookshelves include a very valuable treatise, entitled, "Rustless Coatings: Corrosion and Electrolysis of Iron and Steel." It is from the pen of Colonel M. P. Wood, a prominent member of the American Society of Mechanical Engineers, who is well known to the older generation of gas engineers. The book is a handsome 8vo, the descriptive matter covers 432 pages, and is illustrated by 80 or more figures. The publishers are Messrs. John Wiley & Sons, of this city, which is a sufficient guarantee that the book is all right from the standpoint of printing and binding. The matters treated of relate to paints and pigments for the better preservation of iron and steel, which subjects often appeal (in fact, all the time appeal) to the gas man. In his preface to the work Colonel Wood remarks: "The subjects are so grouped in the work, and so detailed in the index, that the busy man can find the data that will bear on the case in hand and enable him to avoid some, if not all, of the unfavorable results that have attended previous applications of some misleading trademark mixture. Most of the analyses and tests of the commercial pigments and paints have been repeated many times without any material discrepancy from the data herein given. The results from the use of many of these paints are apparent in the excessive and continued corrosion of important ferric structures everywhere. He who runs may not always read, but he can at least see, hence should be able to profit by the experience of those who have succeeded him." The price of the book is $4.

We are also in the receipt of the Thirty-fifth issue of "Field's Analysis," which has to do with the treatment, in minute, logical and clear way of the "accounts of the principal gas undertakings of England, Scotland and Ireland, for the year 1903." We can give it no greater praise than to say that the 35th issue of "Field's Analysis" is at least up in merit to that of any of its predecessors.

NOTES—

THE New York and Westchester Lighting Company, of Port Chester, Westchester county, N. Y., has been incorporated, with a capital of $250,000. It is to operate gas and electric lighting plants in New York city, Yonkers, New Rochelle, Mount Vernon, Pelham and other towns and villages of Westchester county. The nominal Directors are: Cortland Betts, F. U. Gilfoyle and Joseph E. Freeman. This is likely the taking-over corporation for transferring the properties of the Westchester Lighting Company to the Consolidated Gas Company.

THE Kansas City-Missouri Gas Company, of Kansas City, Mo., paid into the city treasury last week the sum of $10,694.14, which represents 2 per cent. on its gross receipts for the 6 months ended June 30th, such payments being in the nature of a franchise tax.

THE proprietors of the Lockport (N.Y.) Gas and Electric Light Company have reduced the net rate for gas sold on illuminating account to $1.30 per 1,000.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

We Believe Credit was Given to Mr. Egner in the Detailed Report of the Librarian.

NORFOLK, VA., July 12th, 1904.

To the Editors AMERICAN GAS LIGHT JOURNAL: As, much to my regret, I could not be present at the recent meeting of the Western Gas Association, the reading of the proceedings in the JOURNAL is the next best thing to it; and doing so I was somewhat surprised, on reading the report of the Library Committee, to find that they, in speaking of contributions made to the library, said nothing about a contribution made by the writer.

Being impressed with the thought that means of carrying out in practice some of the lessons taught by the valuable books in said library would be a desirable addition, I presented the Association with a complete Elliott's apparatus for the rapid analysis of gases, including a Rhumkorff induction coil, and a book (pamphlet) describing its use; also, a list of re-agents required, and how to make those which cannot be bought ready made.

The gift was acknowledged with thanks by both the President (Mr. Shelton) and the Secretary-Treasurer (Mr. Dunbar) and, as these gentlemen seem to have overlooked mentioning the apparatus in their report to the Association, I beg leave to write to you and ask you to kindly notice it, in order that members who have no apparatus for analyzing gas and would like to try their hand at it, might avail themselves of the above, if they so desired. The apparatus was complete in a case, suitable for shipping, and possibly is among the exhibits of the Western Gas Association at the Fair. Very respectfully, FREDERIC EGNER.

OFFICIAL REPORT.—REVISED BY THE SECRETARY.—CONCLUDED FROM PAGE 47.]

TWENTY-SEVENTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD IN THE HALL OF CONGRESS, ADMINISTRATION BUILDING, LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO., JUNE 14TH, 1904.

AFTERNOON SESSION.

President Shelton then called Vice-President Thwing to the chair and the former read his paper on

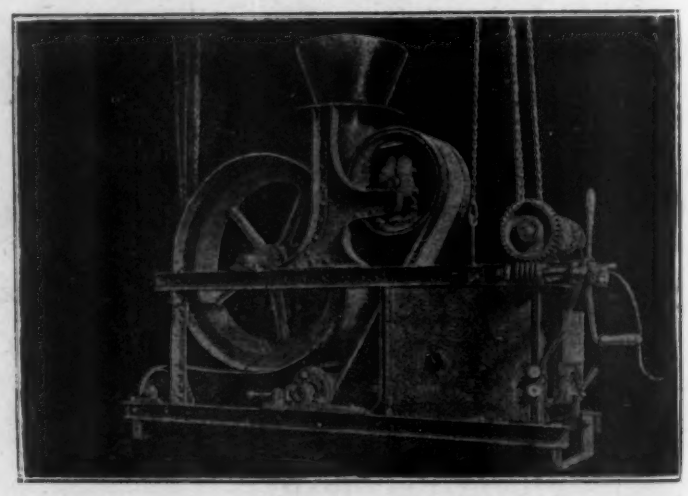
COAL PROJECTORS.

In the last year or so there has been developed such an exceptionally simple, ingenious and effective new apparatus and method for charging coal gas retorts that I believe it very desirable to herewith bring such to the attention of the members of this Association, particularly as there has been practically nothing worth while descriptive of it, so far, in the American Gas Journals, and most gas men, I believe, do not yet know of what I shall describe—viz., "Centrifugal Coal Projectors."

We are all more or less familiar with the older type of charging machinery, such as the West, the Ross, the Bronder, the Foulis, etc.; machines that are wonderfully ingenious and very effective and that greatly reduce the labor cost in large retort houses. But we likewise know that as a class they practically are only warranted in large works, being ponderous, complicated and very costly. And we likewise know that some simple and comparatively inexpensive machine for charging in small works is tremendously desirable.

It looks as though such a machine has been found in the DeDrouwer coal projector, and as it is the first and best represents the principle and type of two or three forms since evolved, I will describe it first.

It is illustrated in the cut herewith, and is the invention of Mr. J. De-



Brouwer, of Bruges, Belgium. It consists of a wheel about 4 feet diameter and perhaps a foot width of face (suspended from rails overhead) in front of the benches. The rim of the wheel has a groove in it about 8 inches wide and 4 inches deep. About a quarter of the rim is covered by an endless leather belt that presses against it and runs over 3 small guide wheels, with a tightening device; a 10-horse power electric motor is attached that runs the whole thing. The apparatus is arranged so that it can be easily raised or lowered, opposite any retort level, or pushed along to any bench to be charged. When in position it is also under a spout, leading from a continuous bin overhead, carrying the coal to be charged. Another, though less desirable form, runs on floor rails and carries a hopper with enough coal in it to charge several times without replenishing.

To operate, the attendant starts the motor, which in turn makes the belt run around, and it, pressing against the edge of the 4-foot wheel, makes it revolve in turn. In a few seconds the large wheel is running 200 revolutions a minute. The operator then pulls the lever of the coal chute overhead and the coal falls into the hollow groove of the revolving wheel. It absorbs the motion of the rim, being held against it by the belt, travels around with the rim about ¼ of the circumference, and then being released flies off by centrifugal motion in a continuous stream, straight into the retort. The stream of coal is like a stream of continuous shovelfulls. It is almost like playing a stream of coal from a hose. It is beautiful. The coal is thrown clear to the back end of the retort, and builds out evenly and rapidly until the full length of the retort has been charged, 8 inches or 9 inches deep, when the operator

shuts off the coal supply, pushes the machine to the next retort and repeats. The speed is equal to and even faster in some cases than that of the big, old-type machines, for the rotary projector throws in a charge of coal, say 400 pounds, evenly distributing it, in about 12 seconds. Shifting to the next retort takes about 6 or 8 seconds; 5 or 6 retorts can be charged in 1½ minutes, or 3 or 4 in a minute, in regular operation. No part of the machine is nearer than 4 feet to the mouthpiece.

The great attractiveness of the apparatus is its extreme simplicity, and the fact that it is suitable for any ordinary retort house with even only a few benches. There are no reciprocating parts, cranks, or joints to break or pound, or requiring constant adjustment or skilled mechanical attention. There is nothing but one large wheel, 3 little wheels, plain bearings to grease, a belt and a small motor. Wear and tear is slight and easily made up. The rig weighs perhaps 2,000 pounds, and the price when on the market certainly ought to be small.

Such is the latest thing in charging machines. Invented in 1902, and used successfully in the Bruges works, it has already been put in several other Continental works and in several English works. One machine imported has been tried for some months in one of the New York stations, exciting much admiration for its work. This machine I have repeatedly seen at work. Mr. Somerville has arranged for one for Indianapolis, Ind.

The best description I have seen of it is in the *Journal of Gas Lighting*, March 24th, 1903, page 748. Lesser articles are in the same: May 12th, 1903, page 367, and May 26th, 1903, page 523. Also in the *Gas World*, May 16th, 1903, page 811. The English patent (abstract) is in the *Journal of Gas Lighting*, August 26th, 1902, page 569. The American patent is No. 716,201, dated December 16th, 1902, to J. DeBrouwer. The English agents are Messrs. W. J. Jenkins & Company, Ltd., Retford, England; the American agents are Messrs. Bartlett, Hayward & Company, Baltimore, Md.

About the same time that this machine was being developed, as is often the case, another apparatus was being developed, operating on the same main principle (viz., the use of centrifugal force to throw or project the coal into the retort), in Paris, at La Villette Works, by the Paris gas people. This machine takes the general form of a vertical, turbine wheel, carried in a traveling car in front of the benches, on floor rails. The wheel is horizontal with the axis vertical. It has 5 blades and is about 38 inches diameter. It has no belt. It, too, is spun around and up to 400 revolutions per minute. The coal is dropped in between the blades from a feed-spout overhead, where the blades catch it and throw it in the retort, also in a continuous stream. The Paris machine is much the heavier and larger, weighing some 10 tons, but is built to carry with it some 4 tons of coal for charging without fresh supply. It uses some 20-horse power and takes about 30 seconds to get up speed and charge a 20-foot retort.

This machine is copiously illustrated and described in an article entitled "The New Parisian Retort Charging Machine," in the *Journal of Gas Lighting*, May 19th, 1903, page 429; also, May 26th, 1903, page 509. Patent abstract may be found in the *Gas World*, January 3d, 1903, page 20; and a brief description, *Gas World*, December 20th, 1902, page 1003; also, May 30th, 1903, pages 905, 906 and 907, where F. D. Marshall gives figures on operating cost, etc.

And while the Belgians and the French were evolving these two forms of rotary or whirling machines for coal charging, a German was doing the same thing, for in the *Journal of Gas Lighting*, is an illustrated, though brief article, October 6th, 1903, page 45, describing the "Kobald" charger, as made by C. Eitle, of Stuttgart, and of which I have since seen blue prints. It, too, is a rotary, simple form, suspended like the De Brouwer, but using no belt, but blades instead (3) like the Paris machine. Operated also by a small electric motor, it gets its supply from an overhead bin, and pushed along the retort house, also throws, into any desired retort, in a quick, uniform stream a few hundred pounds of coal in a few seconds.

There is also to be noted a centrifugal machine patent abstract to W. L. Wise, *Journal of Gas Lighting*, December 23d, 1902, page 1695; but whether this is still a new form or the English patent of one of the above machines, I do not know. Some description is given in the *Journal of Gas Lighting*, January 6th, 1903, page 39. It is on behalf of the Compagnie Parisienne d'Eclairage et de Chauffage par le Gaz.

Whatever the individual form may be, these new machines are a great step in advance. They attain: Low first cost; greater labor economy; adaptability to small works; minimum wear and tear; great capacity; great certainty of operation.

They have surely come to stay. They are absurdly simple, effective and ingenious. Skeptics have been apparently unable in the past year to show any weakness in them, or objections of any moment, beyond the fact that for their best working they require the coal to be crushed to a uniform size, and practically require some accompanying system of coal conveyors and overhead feed bins. But this latter is a good thing in any works, and the former in such a system is easy to arrange.

In the opinion of the writer, their great simplicity and applicability (by varying the speed and details) to any lengths of retort and weight of charge will sound the death knell to the older type of ponderous expensive machines. And as they reach the same low labor cost as such machines, and as low as in inclines (and without the high and special retort houses, or special construction, or heavy cost of the latter), I believe they will have a decided retarding influence upon the growth of inclined retorts.

A model ol the DeBrouwer apparatus first described has been secured by this Association for exhibit at the Exposition. I commend it and the whole subject to every manager interested in the matter of cheap charging.

Discussion.

The Chairman—You have heard President Shelton's interesting paper. It is now before you for discussion.

Mr. Copley—I would like to ask in what station of the Consolidated Gas Company, of New York, this machine is being operated?

Mr. Shelton—At 14th street and East river.

Mr. Copley—The engineer of the station expressed himself as being perfectly satisfied?

Mr. Shelton—Everyone whom I heard speak of it, from the Chief Engineer, Mr. W. H. Bradley, down, expressed themselves as very much satisfied with it.

Mr. Norris—At the last meeting of the New England Association of Gas Engineers, Mr. Bradley spoke of this machine, and extended an invitation at that time to any gas man interested to come and see it work. As a matter of fact, however, I believe it is not in continuous operation, so that possibly it is necessary to make some arrangements beforehand to see the machine work. Possibly Mr. Shelton can say whether it is in regular operation now or simply in experimental use.

Mr. R. M. Searle—Chief Bradley told me about 10 days ago that the machine was regularly operated, and very kindly said I could bring as many men as I wanted to see the machine. He is very much pleased with it. I would like to ask the cost of the machine in this country, if Mr. Shelton knows. I understand in England it cost about $1,000 to import it into this country; that it was in the hands of some bright American manufacturers, and the price was higher.

Mr. Shelton—I think it is not yet sufficiently on the market to have established any price. I don't know any definite figure on it. Messrs. Bartlett, Hayward & Co., of Baltimore, have the agency for the machine, and they told me, owing to press of construction work, they had been delayed in getting out the plans, patterns, drafting, etc., to offer it as yet on the market.

Mr. Lindsay—As I understand the operation of this machine the coal is uniformly placed in the retort. Is that correct? How do they regulate it so as to get the same depth at the mouth of the retort as at the rear end?

Mr. Shelton—The coal is blown in or thrown in practically by centrifugal force just hard enough so that when it hits the back end of the retort it causes it to "build forward." It has not enough force to climb up over itself and block up the back end of the retort. The speed is tested, and just the right speed used as will throw the coal in a 20-foot retort, at one speed, or in a 10-foot retort at less speed, and that permits the coal to build forward. The coal is usually handled from an individual hopper that will give just the measured number of pounds of coal desired to throw into the retort, so it necessarily follows, as the coal builds forward, that when the coal gives out it ends at the mouthpiece, when a man claps the lid on the retort. It would seem as though it would be almost impossible to charge that way and get a uniform bed such as is necessary, but the "proof of the pudding is in the eating." There is no question that the retorts are charged with great uniformity, probably a great deal more uniformly on the average than by any hand charging, and at least equal to the best machine charging. In order to illustrate this, Mr. Bradley had constructed in the 14th street works a wooden retort, placed in the same position (the same height and the same distance and everything) as in a clay retort, and after blowing in two or three charges into as many retorts to show his visiting friends, he would push the machine out to the wooden retort, charge it under the same conditions, and then have "Mike" lift the lid so that all might be satisfied as to the distribution of the coal. It certainly was most uniformly distributed from the front to the back of the retort.

Mr. Norris—I would like to ask Mr. Shelton whether, in case of the

Paris machine, with retorts 20 feet long, if his understanding is that they find it necessary to slow the machine up during the process of charging, so that when it is throwing the coal 20 feet it would be running faster than when only throwing 5 or 6 feet. I understand that in a comparatively short retort the coal will slide against itself and give a comparatively uniform charge, but in case of excessively long retorts it would seem necessary, and is readily possible, to regulate by hand the speed of the machine so as to give a uniform charge.

Mr. Shelton—Mr. Norris brings out the point of proportionate speed. In the 20-foot retort the speed I imagine starts at 400, if I recollect rightly, or rather, they speed the machine up to 400 before they permit the coal to drop in to be thrown into the retort, and as it is in operation they decrease the electric power, by some suitable contrivance, so that the speed shall slow down somewhat; it falls off in speed as the retort becomes charged. It is a matter of experiment to find out the proper speed for the particular work.

Mr. Baehr—I should think one extremely good point about this machine is that you could install it in retort houses as they are to-day. The retort houses in a great many works are so narrow from the face of the bench to the wall that the standard style of large machines cannot be put in there. With this machine there would be no trouble in installing them in the space that would be found in any retort house. In my own experience, I have endeavored to put in the large charging machinery in some old retort houses, but was unable to do so on account of the length of the machine. The DeBrouwer machines ought to go in anywhere, and as they are cheap, it seems to me they are very desirable as a solution of the stoking problem in the old retort houses.

Mr. Shelton—I do not happen to have personal knowledge as to the fineness of the coal that can be worked with them. They seem to take mine run coal and crush it, eliminate the large lumps down to 2 or 2½ inches, and then proceed without care as to large or small.

The Chairman—Are there any further remarks?

On motion of Mr. McIlhenny a vote of thanks was extended to Mr. Shelton for his interesting and instructive paper.

Report of Committee on the Work Performed by President Shelton Respecting the Gas Exhibit at the Fair.

The Chairman—A Committee was appointed by the Board of Directors to propare resolutions expressive of our appreciation of the work of President Shelton in getting together the Gas Exhibit that we have admired so much. Is that Committee ready to report? Mr. John D. McIlhenny is Chairman.

Mr. John D. McIlhenny—Mr. Chairman, as a member of the special committee of our Board of Directors, consisting of Messrs. J. B. Howard, Thos. D. Miller and myself, I wish to express publicly in the meeting of the Western Gas Association some appreciation of the work which Mr. Shelton has accomplished in the consummation of the exhibit of gas appliances at the Louisiana Purchase Exposition. When the Exposition in St. Louis developed, and as it was seen that it would be a great event, the idea came to the minds of those connected with the gas business it would be most desirable that some public exhibition be made of the gas industry. A special man is needed for just such work, and as has fortunately been the case in matters of State and of great importance, a man was found for the occasion, with the many qualities necessary, including a sincere affection for the gas industry, zeal, industry, discretion and ability to obtain the necessary funds in order to carry on the work. Mr. Shelton, at that time the incoming President of the Western Gas Association, assumed the task, and to him we say the entire credit is due. He has performed an enormous amount of work. He has issued a tremendous quantity of literature, and the result is you have a very creditable gas exhibition, the best one in any general public exposition held in the United States. I understand he was unable to obtain the space desired; in fact, that the space allotted was only about one-third of that requested, owing to the fact that the applications for room in the Liberal Arts Building exceeded by several times the amount of space. Many difficulties were also encountered from the beginning. One difficulty was to arrange the exhibits to properly show them in a small space; another, in having the work finished, owing to delays due to scarcity of labor and to labor unions, etc., in St. Louis. This latter also made the work more expensive than anticipated. I want you to see the exhibit for yourselves, and I think you will join me in saying it is most creditable and instructive to those in the gas business, and at the same time it shows the public that the gas business is a profession of the highest order. I think gas companies as a rule have overlooked the importance of educating the public to a fitting recognition of the ability and qualities necessary to the gas business. The average citizen stands in admiration at the exhibition of electricity in its various forms, knowing that it requires wonderful and exceptional ability; but he does not think about the gas business in the same way, for he knows nothing of it. Our citizens should see something of the gas business, and should know that gas is not merely pumped from the surrounding atmosphere. They should know that great quantities of materials, complicated apparatus and skilled labor are necessary. President Shelton is entitled to a great deal of credit. Your Directors have been very glad indeed to appoint a committee to make public expression of this fact, and I move individually that the Association hereby expresses its deep appreciation of the most successful services of Mr. Shelton in connection with this exhibit. (Great applause.)

The Chairman—We would be glad to hear from any other gentleman who feels that Mr. Shelton's efforts should receive further appreciation. We all know he has worked very hard.

Mr. Doty—I simply desire to say, having in mind Mr. Shelton's evident interest in obituaries, that in St. Paul's Cathedral, London, on the splendid English memorial designed by Sir Christopher Wren, and where his monument is, there is this inscribed: "If you would see what he has done look about you." It seems to me the gas exhibit of the Western Gas Association will be a memorial to Mr. Shelton, and while we hope he will not yet be buried in St. Louis, we can truly say, if he wishes a memorial, we can do no better than to look at his exhibit and say as we look around it this is what Shelton has done; by that work we shall know him.

Mr. Boardman—I wish to say I have observed Mr. Shelton's course since he first became a member of a gas association. This achievement is merely the last step in a progress that has been continuously upward. He has been throughout it all a conscientious worker and a liberal contributor to our knowledge and our pleasure, and I am satisfied that, however great the achievement at present, we are bound to see still greater in the future. I join most heartily in seconding the motion for a vote of thanks for this particular endeavor.

A rising vote was thereupon taken upon the motion to tender a vote of thanks to Mr. Shelton, and the same was unanimously carried.

Mr. Shelton—Gentlemen, I can only say that listening to Mr. Boardman was pretty near like hearing one's own obituary. But I would say this. What you have said is worth a heap sight more than all the obituaries you may stick up later. What I have done has been done from the heart; it was a labor of love. The Western Association has been nice to me, and I have tried to be as nice as I could in my work, in my acts, in return. As to this matter there has been a good deal of detail, a good deal of hard work, a good many disappointments. I shall not take up your time this afternoon by going into details, for it is in my report of 4 or 5 pages that was repored to the Board of Directors yesterday, and you will find printed in the archives of the meeting. I think that is probably the best way to leave it. I can only say that what I have done was done sincerely, and I thank you for your appreciation of whatever measure of success I have reached. I hope you will be lenient in criticism of what mistakes we have made, for they are practically inevitable in a work of that kind. Gentlemen, I thank you.

The President then resumed the chair and the report of the Auditing Committee was received, accepted and ordered filed.

The President—I will call upon Editor W. E. Steinwedell to present the budget which he has collected on account of

THE WRINKLE DEPARTMENT

for the past year.

[For the Wrinkle Department Report, see JOURNAL, June 20, 1904, p. 963.]

Discussion.

The President—Gentlemen, discussion is now in order on any of the nine topics broached.

Mr. Norris—Regarding Wrinkle No. 5, the question arises as to what becomes of the gas in case the safety seal blows. In the case of a water gas plant the problem is a simple one, for all that is necessary to do is to pipe the safety seal so that it will discharge into the inlet of the exhauster, and in case the seal blows the exhauster simply pumps the gas around and no gas escapes into the atmosphere. In the case of a mixed gas works, where there are separate exhausters for the two gases, the relief seal of the coal gas exhauster can be piped so as to blow into the relief holder, or into the inlet of the water gas exhauster. In the case of a straight coal gas works, it is, of course, necessary to blow the excess gas into the air; or a direct connection could be made to the storage holder, and should the seal blow, in such case a certain amount of foul gas would go directly to the storage holder. A simpler construction of this device than that shown in the sketch is that of the ordinary washbox in which the dip-pipe goes through the top of the box, which does not involve any complicated castings.

Mr. T. D. Miller—One wrinkle here, No. 7, to give the alarm when it is time to read the meter and stop the power, is a very ingenious and simple arrangement, but I do not find any provision for giving an adequate alarm when the man is hard of hearing. In such case you would have to put an electric alarm on it.

Editor Steinwedell—An electric attachment was described in the Wrinkle Department of the Wisconsin Association.

The President—I would like to ask (in connection with Wrinkle No. 5) to what extent dry lutes are being adopted for purifier work. It is my observation that dry lutes are growing. I have used them in 3 or 4 instances myself, doing away with the old wet seal, rusting sides and blowing cups. It seems to me now that dry lutes have started they are almost bound to grow. Is that the observation of some of the other members?

Mr. Doty—I can say the Detroit City Gas Company has two installations of purifying boxes with dry lutes, one at Station "A," the other at the Delray Station; also several installations of these safety blow-off seals. At these plants the escaping gas if any is allowed to vent itself into the atmosphere. I do not recall that this escape is at all frequent. Mr. B. O. Tippy, superintendent of manufacturing at Detroit, is in the room, and I am sure he will tell you about it.

Mr. B. O. Tippy—Our safety seals are ordinary water gas washboxes, the discharge pipe leading the escaping gas outdoors. We selected a place for the discharge where it would be safe for it to blow, and at the same time where the escaping gas could be quickly discovered.

Mr. Fulkerson—I would like to ask someone better posted than I am to give me a cause for the flooding of those seals, if the plant is properly attended to.

The Secretary—I would suggest possibly you might have sustained a stoppage of the inlet to the holder by naphthaline.

Mr. Fulkerson—Could not that be attended to in time without any sudden stoppa ge?

The Secretary—I don't know; perhaps it could if he completely understood the technical as well as the practical side of his business, and could foresee all difficulties that were likely to arise. If he were infallible probably that could be done.

A Member—I do not agree with the gentlemen on that point, although I am open for argument; but I will say that in five years' observation I have not had a blow. I am using a dry seal and a Chollar purifier, and I have had no blows whatever, although I have provision made to take care of them. They told me I should have provision made for blows but I have experienced none.

Mr. T. D. Miller—How long do you leave your oxide in?

A Member—My oxide has been running 18 months.

Mr. Fulkerson—I have never had any back pressure in 5 years sufficient to blow seals. Those troubles likely to arise are looked after every day and taken in time.

Mr. Norris—In this connection I would like to say I have heard of people carrying life insurance for more than 5 years without dying—but that is not what I got up to say. I want to call your attention to the fact that these safety devices, which are in my judgment undoubtedly useful in certain cases, may be made with very much smaller connections than the regular yard connections around the works. For instance, an 8-inch pipe and an 8-inch safety seal will pass a great deal of gas, and would probably take care of works with 16-inch connections, provided the connections of the 8-inch seal are sufficiently short.

Mr. T. D. Miller—We had two boxes, and in that time, when in the largest year's make we had somewhere in the neighborhood of 40,000,000, we never had a dirty box. A change of boxes was necessitated by an increase of pressure caused by the sponge packing from being in the box so long, and while we did not have any gas to blow out our lutes overflowed and gave a warning to us and we would get at the box. Mr. Norris's remark is appropos, that he might have been using it for 5 years and it had not happened, but he may have a telegram reach him before he leaves here that he has had a blowout.

Mr. J. R. Lynn—In an experience dating back through many years, I have made more changes of purifying material because of oxide packing than from all other causes. Under such condition we had an unusual back pressure, and I do not think there are very many here who have not had similar experience.

On motion of the Secretary, a vote of thanks was extended to Editor Steinwedell for his labors in editing the last wrinkle budget. In putting the question the President said: It gives me great pleasure to put the question to a vote, because as Editor of the Wrinkle Department for some years I know something of the labor required. The stock of Wrinkles has been largely added to, but the supply does not keep pace with the demand.

The Secretary—I have something to add to that. In addition to the labor of Mr. Steinwedell as Editor of the Wrinkle Department, the presentation of which you have had to-day, he in the last year compiled and edited the publication of Wrinkles of all the Associations, from the years 1890 to 1900, inclusive. It was a book approaching something like 600 pages. It was mailed to all the members of the Association, and from a perusal of them you will have an idea of the immense amount of effort of a thorough and painstaking sort that was required of him to do in his work in the past year, so that a more than usual hearty vote of thanks is due to Mr. Steinwedell.

The President—The Secretary amends his motion, therefore, to the effect that we give Mr. Steinwedell a more than usually hearty vote of thanks and appreciation. I think when we remember that volume of Wrinkles he compiled and put together in united shape (and it has many good points), whenever we have an evening off and need something to do, we can examine that volume all the more to the appreciation of what Mr. Steinwedell has done.

Resignation of Editor Steinwedell.

The Secretary read the following letter of resignation as Editor of the Wrinkle Department by Editor Steinwedell:

Mr. Jas. W. Dunbar, Sec., Western Gas Association: I hereby tender my resignation as Editor of the Wrinkle Department of the Western Gas Association, to take effect at the meeting in June, 1904.

The co-operation of the members and others in assisting this Department has been greatly appreciated and I thank them for the cheerful support offered. Yours very truly, W. E. Steinwedell.

The President—Last year I think Mr. Steinwedell resigned; he is still with us. I think this year he means it, and I think it is only fair that his resignation be accepted, as seems to be his wish, and the election of his successor will fall in with the election of our officers which we will take up in a few moments. Shall the resignation be accepted as it stands?

On the motion of Mr. Norris, duly seconded, the resignation of Mr. Steinwedell as Editor of the Wrinkle Department was accepted with regrets.

Preliminary Vote of Thanks.

Mr. T. D. Miller—Before we go into the election of officers, there is a little matter that has been customary, not because it is customary, but because I feel in this particular instance it is not only desirable but will be heartily indorsed by everybody, as "coming events cast their shadow before." I am sure everyone here is perfectly willing and anxious to vote an unusually hearty vote of thanks to the Committee of Entertainment who have had charge of the local entertainment of this meeting of the Western Gas Association; and I, therefore, make such a motion. [Seconded.]

The President—Certainly no other motion will give us more pleasure to vote upon than that to show our appreciation of the good work of the local committee. They have had an unusual number of people to take care of; they have had a complication of arrangements arising from two organizations, two bodies of men meeting, the Western to-day and various representatives of all the Associations to-morrow and next day. And they have had some trying conditions connected with the Exposition here to meet with. I suppose the gentlemen here and the public generally appreciate the difficulty of putting these things through in satisfactory shape during an exposition year, and it is with special pleasure I put before you the motion for action showing our appreciation of the work Mr. Cowdery and his able assistants, every mother's son of them! They have done valiantly. The motion is made and seconded and is before you for action. Those in favor of a vote of thanks to our good local friends here who have taken such good care of us will say aye.

The motion was unanimously carried.

The President—The man who dares to vote to the contrary may stick up his head?

Election of Officers.

The Association then proceeded to the election of officers for the ensuing year, which resulted as follows:

For President—Mr. O. O. Thwing, St. Louis, Mo.

For First Vice-President—Mr. Paul Doty, St. Paul, Minn.

For Second Vice-President—Mr. K. M. Mitchell, St. Joseph, Mo.

For Secretary and Treasurer—Mr. J. W. Dunbar, New Albany, Ind.

For Directors (to serve 2 years)—D. R. Warmington, Cleveland, O.; Wm. E. Steinwedell, Cleveland, O.; W. A. Baehr, St. Louis, Mo.; Walton Clark, Philadelphia, Pa.

For Director (to serve 1 year)—H. L. Doherty, New York City.

Some Responses.

Mr. Thwing—Gentlemen, it would be impossible for me to tell you how I appreciate the honor that you have done me. Words wouid not be adequate. You know I love the Association in all its workings. That is enough to say.

Mr. Doty—Gentlemen, I am deeply appreciative of your courtesy in bestowing upon me the honor of the election to be your Vice-President. I hesitate to think myself worthy of this mark of your favor. I know the splendid work that has been done by those who have been officers of your Association, and their inspiration leads me on to hope that, with your assistance, I may be successful in furthering the good work of the Western. The phrase "Captains of Industry" is a very common one just now. It is something nice to roll around one's tongue. In Mr. Shelton you have a true example of a Captain of Industry. He is a leader of men. You have selected this year Mr. Thwing to be your Captain of Industry, and I may say you have chosen me to be your Lieutenant of Industry. I assure you it will be my pleasure to work as Mr. Thwing's lieutenant to further the work and advance the interests of the Western Gas Association.

Proposing a Change in Election Policy.

Mr. Doty—Before we adjourn, Mr. President, it seems to me the Association should give some thought to the value of its time in these conventions. At the least calculation, this meeting probably costs $10,000, paid in the expenses of the delegates in attendance. Assuming a 6-hour session, it would make the expense per hour over $1,500; 60 minutes to the hour would make the expense $25 per minute. It seems to me this method of election by convention balloting, althongh democratic and popular, could be changed without sacrificing any of the freedom of the ballot which has become the settled policy of the Western. May I suggest that this matter be referred to the Directors, with instructions to report at the next meeting on a plan that will be practicable to secure a popular election of officers with the least expenditure of time on the floor of the convention. I am sure the Directors can be entrusted to devise a plan that will not only give the fullest opportunity for the expression of the desires of the members, but at the same time expedite the work of the convention, and also avoid any nominations by committees having in mind the perpetual selection as officers the friends of the committee. The latter practice the Western will not tolerate. So I move you, Mr. President, that the Board of Directors be and they hereby are instructed to prepare and submit to the next meeting of the Association a plan under the constitution whereby the election of officers by ballot can be more expeditiously carried out, and still provide for a full and free expression of the desire of the members in the election of officers.

Mr. Chollar—The by-laws provide that officers shall be elected by ballot only. All we have to do is to appoint nominating committees to select officers. It requires no action at all by the Association. The by-laws are all right in either place.

Mr. Copley—This method was changed at the Cincinnati meeting in 1897 or 1898. It was changed back after that convention, and the present method has since obtained. It was the sense of the Association at that time.

The Secretary—I do not believe the method of electing officers can be changed except by changing the by-laws. Mr. Doty's motion directs the Directors to formulate a plan and report; there is nothing wrong in that. I second the motion. I am not in favor of changing the method, but I think that is the best way.

The President—The motion is to refer the matter to the Directors to formulate a plan and report to the next meeting of the Association, when the Association can reject or adopt it as it sees fit. [Adopted.]

On motion the following paper on

THE VENTILATION OF GAS RETORT HOUSES,

by Mr. Alfred Lotz, of Chicago, was taken as read, and ordered incorporated in the proceedings.

The various branches of engineering each have their particular and peculiar problems to be solved. Some of these peculiar problems are solved in different ways by different engineers, under whose notice they chance to come, as follows:

Some figure out to a nicety just what size and style of apparatus is going to give them the best results, basing their assumptions and calculations on theory. Others will make a guess at what they think looks plausible and should do the work, and the last class of engineers base their calculations on extensive practical experience coupled with theory, and a large percentage of that factor in all branches known as "common horse sense." This latter is the class of engineers the world over who are most successful.

I have been directly connected with the various branches of engineering, including electric, mechanical, hydraulic, and, at present, with pneumatic, as pertaining to heating, ventilating and drying, and in no other branch is that valuable factor, experience, more necessary than in heating and ventilating engineering. In the ventilating branch, especially, it is a sad but true fact that the great majority of so-called engineers are prone to make definite assertions with bold front, with no actual experience or knowledge to back them up, and in laying out a ventilating plant for a specific purpose will rely entirely on their ability to make a good guess, and, as a natural consequence, often come to grief, both as regards themselves and customers.

The problem of ventilating a building used for any specific purpose is rather more complicated than would appear on the surface. It is easy enough for an engineer to say an air change of once every minute or two will give the proper results, but that is not all that must be taken into consideration.

For instance, suppose you have a large kitchen with ranges which are generating considerable steam, there is really no way to figure out a ventilating plant on any prescribed formula, and it resolves itself into a matter of experience only as to how often the air should be changed to give the proper results.

Again, we have a large paper and pulp mill. Here at least we have a definite basis for our calculations. We know how many tons of dry material they wish to produce per day of 24 hours. We know what percentage of water this material holds when in a wet state, and also know how much is evaporated per hour, which in even an average mill is quite considerable. On cold days especially this moisture condenses as soon as it is formed, and the entire room is filled with the vapor so that one cannot see a distance of four feet. To try and remove this vapor by means of a fan only is almost a practical impossibility, and it is consequently necessary to blow heated air into the room in such quantities that the moisture will be taken up and held in suspension by same. Then, by means of a ventilating fan, connected with hoods over the machines, the moisture laden air is removed from the building, the moisture becoming a vapor the instant it comes in contact with the outside air. By this means the atmosphere in the room is kept practically clear.

Every gas house manager and superintendent is only too familiar with the very objectionable features connected with the old time method of quenching hot coke from the retorts, the delay in handling it when quenched, the deterioration of ironwork in the building, and the danger to the working force, as well as the inefficiency of same, all due to the accumulation of steam and gases arising from the coke, and the inability to get rid of it in anything like a reasonable time.

Many schemes have been resorted to in order to overcome this difficulty, but none of the older forms have given anything like desirable results. In retort houses where half-depth benches are used, the coke being drawn directly on to the charging floor and quenched, the natural ventilation due to a high roof is depended on, and if external atmospheric conditions are favorable the results may be more or less satisfactory.

But where either half-depth or full-depth benches are used in connection with a separate charging floor, the coke being deposited underneath this floor and quenched there, the ventilation becomes a very serious matter. I have been in some plants where this room was connected with large stacks running up through the charging floor and through the roof above, another had a trough suspended at the ceiling, and which trough was connected with a large steel plate fan, the trough, of course, having a certain number of openings to act as intakes for the system. Another plant (Minneapolis) had a large disk ventilating fan placed at one end of the retort house underneath the charging floor. This fan was 60 feet in diameter, and when running at 300 revolutions per minute was handling 63,000 cubic feet of air per minute, requiring 8-horse power engine capacity to drive it. This latter was the best arrangement, as far as results were concerned, and it may be interesting to give it a little closer attention.

There were 22 benches of 9's, the entire stack being 11 benches long and 2 deep, the benches being placed back to back. The room below the charging floor was 180 feet long, 65 feet wide and 11 feet high, making a total of about 130,000 cubic feet; allowing for the space occupied by the stack, which amounted to 33,000 cubic feet, we have left 97,000 cubic feet. The fan capacity, as above stated, was 63,000 cubic feet per minute. This would give an air change of once in every 1½ minutes approximately. The natural conclusion would be that the room ought to be perfectly free from steam and gases in 1½ minutes after the quenching was completed. The actual results, however, were far from that, the reason being that there were always more or less windows and doors open

near the fan, and the air would rush in from these, supplying the fan with all the air it could handle and short circuiting that part of the room which really needed the ventilation most.

The only possible way to have accomplished a complete removal of the steam would have been to have the air replacing that which was exhausted by the fan enter at the farthest point from the fan and keep all the windows and doors, as well as all openings between rooms underneath and above charging floor closed, which, of course, is not to be thought of in a retort house.

We will now take up a ventilating system recently devised by a firm of ventilating engineers of Detroit, Mich.

About October or November of last year the Detroit Gas Company, Mr. B. O.Tippy, Superintendent, laid the proposition of ventilating its retort house before the engineers in question, and the problem was gone over and looked into very carefully. At about the same time we received a request from Mr. Douglas, Manager of the Ann Arbor (Mich.) Gas Company, asking us to look into the subject as pertaining to their plant. This latter was taken up by the writer personally.

There were many questions which presented themselves, and I daresay, with all the vast experience we have had along other lines of manufacturing plants, the proposition of ventilating a gas retort house successfully was an experiment with us, as well as with the gas company. However, two systems were devised which have been covered by letters patent and installed, one in the Detroit plant, the other in the Ann Arbor plant. In actual principle the plants are the same, though in construction they differ very materially, and I will only give a description of the one at Detroit, which was finally decided on as the standard of design and construction for all future plants.

Underneath the charging floor, and running the full length of the stack, is suspended a hopper made of reinforced concrete construction, and heavy structural and sheet steel. This hopper is suspended from the I beams forming a part of the construction of the charging floor. About 6 feet of head room is left between the bottom of the hopper and the floor of the coke discharge room. The front of this hopper is provided with heavy sheet steel doors, one door for each set of retorts, a set constituting the retorts in the same vertical plane. For each door is furnished a water spray for quenching the coke. The end farthest from the ventilating apparatus is closed only enough so as not to allow the coke from the last set of retorts to fall out of the hopper.

At the other end of the hopper a large, heavy sheet-steel flue connects with the inlet of a ventilating fan. From the discharge end of the fan a steel flue runs through the outside wall of the retort house, which conducts all steam and gases arising from the process of quenching the coke into the outside atmosphere.

The fan is driven either by direct connected steam engine or an electric motor. The fan and engine can be placed in any convenient corner and out of the way. In the Detroit plant it is placed underneath the charging floor, whereas in Ann Arbor, Minneapolis and elsewhere, it is placed in one corner on the charging floor. The question will naturally arise: "How do you know how much steam and gas arise from the process of quenching hot coke with water, and how would the size of the apparatus vary with the different sizes of retort houses?" This is a very simple matter when thoroughly understood, and leaves absolutely no room for guesswork, but resolves itself into a definite train of calculation, that may be roughly summed up as follows:

We will take a stack consisting of a series of full-depth benches of 9's. The maximum amount of coke that will be drawn at any one time will be that taken from three retorts of one bench multiplied by the number of benches, and, knowing the amount of coal charged into each retort, we have the total amount of coke discharged. As the time consumed in quenching the coke is very short compared to the time elapsing between the drawings this latter does not come into the calculation. Coke leaves the retort at a bright cherry red heat, which is about 1,800° F., and we know from definite engineering data that it takes a certain number of heat units to raise a pound of coal to its equivalent in coke to that temperature, and that this coke when cooling with give off the same heat it has absorbed. Taking the specific heat of coke at that temperature we can figure back how much water is necessary to absorb the heat given off by the coke. From this we can figure the number of cubic feet of steam and gases resulting, and allowing a co-efficient deduced from experience for the additional air necessary to absorb the moisture, we have the total number of cubic feet of gases to be handled by the fan. The vacuum at which this fan must work is dependent entirely on local conditions, and varies from ¼-inch water gauge to 3-inch water gauge, and must be figured to conform with the individual layout. The power required by the fan is dependent on the total number of cubic feet of gases handled per minute, and on the vacuum necessary, which will vary anywhere from 6 to 20-horse power. The operation of the system is as follows: Just before the coke is drawn the fan is started up and a current of air rushes through the hopper. The coke is then drawn and allowed to fall into the bottom of the hopper. Just before drawing the coke, however, the water is turned into the spray pipes. The quenching starts the instant the hot coke and water meet, and the steam and gases arising in consequence are caught by the current of air in the hopper and taken out of the building through the fan. After the coke has been thoroughly cooled the water is turned off and the coke allowed to remain in the hopper for about 5 or 10 minutes while the fan is still running. The air now going through the hopper is perfectly dry and permeates every particle of coke, thus absorbing all water left and thoroughly drying out the coke, making it marketable the minute it leaves the hopper, a feature which has never before been accomplished, and one which will save hundreds of dollars for the gas company, and would pay for the installation of the system in a very short time, thus making the outfit a profit earning device.

Another valuable feature of this system is the fact thut it can be used advantageously in connection with an automatic conveyor system. After the coke is quenched and dried in the hopper it is drawn out and allowed to fall into the conveyor, thus obviating the necessity of quenching the coke while in the conveyor and thereby causing an undue deterioration thereof. This in itself is a very important factor, as a conveyor system is very expensive, and it has been stated to the writer that some gas companies have charged as much as 60 per cent. of the cost of the conveyor against it for depreciation for one year. From this it is evident that, if a conveyor were handling dry coke instead of being subjected to the intense heat of the coke as it leaves the retort, and then to the destructive and corrosive action of the hot steam and gases due to the quenching, the life of the conveyor will be greatly prolonged and its depreciation materially reduced, and a great saving for the gas company will be the result.

THE NEW MEMBERS ELECTED were:

Active.

Andrews, J. C., Denver, Col.
Aldrich, Spokane, Wash.
Adams, H. E., Stockton, Cal.
Ames, K.L., Benton Harbor, Mich.
Barbour, G. H., Detroit, Mich.
Beyerle, W. P., Council Bluffs, Ia.
Busch, J. L., Decatur, Ills.
Bixby, H., Quincy, Ills.
Britsch, M., Chicago, Ills.
Clabaugh, G. W., Omaha, Neb.
Clark, J. C. D., St. Louis, Mo.
Cobb, O. P., St. Louis, Mo.
Calkins, W. B., St. Louis, Mo.
Cornish, R. C., Milwaukee, Wis.
Cocke, J. T. B., Birmingham, Ala.
Chubb, C. W., Kansas City, Mo.
Cutcheon, M. H.
Colvin, T. E., Muncie, Ind.
Deane, E. M., Vincennes, Ind.
Dunbar, Geo. L , St. Louis, Mo.
Evans, C. B., St. Louis, Mo.
Fisher, D. J., St. Louis, Mo.
Fowler, B. C., Richmond, Ind.
Fulkerson, St. Charles, Mo.
Griffith, J. L., Sedalia, Mo.
Hessenbrush, St. Louis, Mo.
Holman, C. L., St. Louis, Mo.
Hood, J. E., Knoxville, Tenn.
Jones, J. O., St. Louis, Mo.
Kay, Jno. M., Chicago, Ills.
Kraft, R. P., Milwaukee, Wis.
Law, A. R.. Durham, N. C.
Lyons, B. F., St. Louis, Mo.
Leamy, Alan, Pittsburg, Pa.
Moran, G. M., Sedalia, Mo.
Markhus, C. G. F.
Miller, W. B., Augusta, Ga.
Marshall, F. L., Centralia, Ills.
McCorkendale, Sherman, Tex.
Olmstead, G. G., Knoxville, Tenn.
Pullin, J. T., Ottawa, Ills.
Runner, R. K., Dekalb, Ills.
Reger, W. S., St. Louis, Mo.
Ritchey, L. J., St. Louis, Mo.
Rettew, J. H., Selma, Ala.
Sullivan, R. O., Leadville, Col.
Stannard, C. M., Denver, Col.
Schott, W. H., Bloomington, Ind.
Steinwedell, Geo., Denver, Col.
Schenck, Rudolph, Chicago, Ills.
Scott, H. C., St. Louis, Mo.
Tucker, C. A., St. Louis, Mo.
Van Maur, J. D., St. Louis, Mo.
Vance, S. M., Bristol, Tenn.
Van Ness, E. G., St. Louis, Mo.
Whithed, Boulder, Conn.
Whitfield, Al., Chicago, Ills.
White, W. F.
Whitton, St. Louis, Mo.
Whitcomb, H. D., Jr., Jersey City N. J.
Watt, Robt., Denver, Col.
Wakeman, A.E., Glens Falls, N.Y.

Associate.

Burgess, W. L., Omaha, Neb.
Bingham, R. W., Phila., Pa.
Brill, A. P., Pittsburg, Pa.
Bigelow, L. S., New York City.
Brewer, R. B., St. Louis, Mo.
Bartless, F. V., Detroit, Mich.
Collins, W., College Point, N. Y.
Dean, M., New York City.
Eisner, J. M., Chicago, Ills.
Goodhue, A. E.
Hicks, G. C., Jr., Connersville, Ind.
Heffern, C. F., New York City.
Holmes, F., Milwaukee, Wis.
Hopton, L. R., New York City
Leavenwort, M., St. Louis, Mo.
Lotz, Alfred, Chicago, Ills.
Martin, W. W., St. Louis, Mo.
McDonald, A., Erie, Pa.
Miller, F. A., Bradford, Pa.
Osborne, H. H., Detroit, Mich.
Reynolds, M. G., Anderson, Ind.
Stadelman, W. A., New York City.
Wickham, E. F., St. Louis, Mo.
Whittmore, C. L., St. Louis, Mo.
Wilkin, J. T., Connersville, Ind.

ROLL CALL.

was answered by the following:

Honorary Members.

Barker, F. E., Boston, Mass.
Howard, J. B., Galena, Ills.
Nettleton, C. H., Derby, Conn.
White, W. H., New York City.

Active.

Andres, J. F., Lexington, Mo.
Atkinson, G. G., Goshen, Ind.
Baehr, W. A., St. Louis, Mo.
Battin, W. I., Chicago, Ills.
Beardslee, C. S., Cleveland, O.
Bedard, F. W., LaSalle, Ills.
Berkley, J. M., Bloomington, Ills.
Blauvelt, W. S., Detroit, Mich.
Boardman, A. E., Brevard, N. C.
Bowers, W. L. Davenport, Ia.
Bowen, F. W., Kenosha, Wis.
Bredel, F., Milwaukee, Wis.
Brown, E. C., New York City.
Buck, E. H., Vincennes, Ind.
Cathels, E., Providence, R. I.
Chollar, B. E., Kansas City, Mo.
Church, L., Flint, Mich.
Clarke, G. S., Kansas City, Mo.
Clapp, G. N., Middletown, O.
Colins, C., Elkhart, Ind.
Copley, I. C., Aurora, Ills.
Cowdery, E. G., St. Louis, Mo.
Cowdery, R. E., Topeka, Kas.
Cressler, A. D., Ft. Wayne, Ind.
Dickey, C. H., Baltimore, Md.
Doan, F. M., Jacksonville, Ills.
Doty, P., Denver, Col.
Doherty, H. L., New York City.
Dougherty, D. J., Jacksonville, Fla.
Dunbar, J. W., New Albany, Ind.
Elbert, V. L., St. Paul, Minn.
Finnegan, A., St. Louis, Mo.
Fisher, J. D., Baton Rouge, La.
Forbes, J., Chattanooga, Tenn.
Forbes, C., London, Ont.
Forstall, A. E., New York City.
Frazer, D. H., Battle Creek, Mich.
Frost, W. H., Delray, Mich.
Fullerton, G., Jr., Buffalo, N Y.
Gerould, C. L., Bloomington, Ind.
Gibbons, J., Jr., Penn Yan, N. Y.
Gimper, J., Galveston, Tex.
Glass, S. J., New York City.
Goodnow, G. F., Waukegan, Ills.
Green, J., St. Louis, Mo.
Haase, E., Milwaukee, Wis.
Haines, J., Des Moines, Ia.
Hartman, W. E., Norfolk, Va.
Horton, T. O., New York City.
Hyde, H. H., Racine, Wis.
Jones, T. C., Delaware, O.
Jones, E. C., San Francisco, Cal.
Keller, C. M., Columbus, Ind.
Kellogg, L. L., Sioux City, Ia.
Kelley, F. W., Davenport, Ia.
Kersting, A. F., Pittsfield, Mass.
Kincaid, H. E., Jackson, Tenn.
Knight, J. J., Kalamazoo, Mich.
Lane, F. K., East St. Louis, Ills.
Leonard, W. H., Chicago, Ills.
Light, G., Dayton, O.
Lorenz, J., Jackson, Miss.
Lynn, J. R, Waterloo, Ia.
Lynn, J. T., Detroit, Mich.
Macbeth, A. B., Kansas City, Mo.
Mansur, J. H., Royersford, Pa.
McDonald, W., Albany, N. Y.
McIlhenny, J. D, Philadelphia, Pa.
Miller, T. D., New Orleans, La.
Miller, A. S., Baltimore, Md.
Mockett, W. E., Dallas, Tex.
Morrell, E. E., Oak Park, Ills.
Murdock, J. W., Joliet, Ills.
Norris, R., Philadelphia, Pa.
Olds, H. L., Lincoln, Ills.
O'Malley, P., Aurora, Ills.
Perkins, B. W., South Bend. Ind.
Pratt, E. G., Milwaukee, Wis.
Purcell, T. V., Chicago, Ills.
Quinn, A. K., Newport, R. I.
Ramsdell, G. G., New York City.
Roper, G. D., Rockford, Ills.
Runner, Z. T. F., Freeport, Ills.
Searle, R. M., Mt. Vernon, N. Y.
Shattuck, J. D., Chester, Pa.
Shelton, F. H., Philadelphia, Pa.
Slater, A. B., Jr., Fort Wayne, Ind.
Spinning, W. V., Peru, Ind.
Stacey, J. E., Cincinnati, O.
Steinwedell, W., Quincy, Ills.
Steinwedell, W. E., Cleveland, O.
Stephens, H. H., Brookfield, Mo.
Strohn, R. N., La Grange, Ills.
Stiles, A. K., Streator, Ills.
Swann, H. R., Louisville, Ky.
Sweetmann, M. M., Kansas City, Mo.
Tayler, G. H., Warren, O.
Tippy, B. O., Detroit, Mich.
Thwing, O. O., St. Louis, Mo.
Travis, F. M., New Haven, Conn.
Walsh, J. T., Chicago, Ills.
Waring, G. H., Omaha, Neb.
Warmington, D. R., Cleveland, O.
Young, J., Allegheny, Pa.
Young, R. Pittsburg, Pa.

Associate.

Ambler, T. M., St. Louis, Mo.
Buckley, J. C., Chicago, Ills.
Carpenter, H. A., Pittsburg, Pa.
Claybourne, C. W., Chicago, Ills.
Collins, D. J., Philadelphia, Pa.
Eaton, A. B., Chicago, Ills.
Elliott, H. J., Chicago, Ills.
Gilman, G. P., Jr., Chicago, Ills.
Guldlin, O. N., Fort Wayne, Ind.
Harper, H. D., Chicago, Ills.
Hayward, S. F., New York City.
Heime, W. E., Philadelphia, Pa.
Humphrey, A. H., Kalamazoo, Mich.
Jacobs, C. H., Detroit, Mich.
Johnston, E. D., Connersville, Ind.
Kahn, L., Hamilton, O.
Lea, H. I., Fort Wayne, Ind.
Lindsay, C. R., Jr., Chicago, Ills.
Marquis, P. S., St. Louis, Mo.
McDonald, D., Albany, N. Y.
McIlhenny, J., Philadelphia, Pa.
Morava, W., Chicago, Ills.
Mordue, T. N., Chicago, Ills.
Mueller, R., Decatur, Ills.
Osius, G., Detroit, Mich.
Parker, G. W., New York City.
Patton, W. H., Chicago, Ills.
Persons, F. R., Toledo, O.
Reilly, J. A., Cincinnati, O.
Russell, D. R., St. Louis, Mo.
Schall, H. D., Chicago, Ills.
Shirra, J. C., Milwaukee, Wis.
Stacey, A. J., Cincinnati, O.
Stratton, S. S., Chicago, Ills.
Terhune, C. F., New York City.
Van Wie, E. G., Detroit, Mich.
Weber, O. B., New York City.
Wickham, L., St. Louis, Mo.
Witherden, G. M., Philadelphia, Pa.

On motion, the Convention was declared adjourned.

[Continued from Page 50.]

Contents of the Question Box as Read at the Twentieth Annual Meeting, Ohio Gas Light Association, Cleveland, O., March, 1904.

No. 61. "What are the results of your experiments with machine cuttings from coal mines?"

"I have been unable to locate anyone who has had experience in the use of machine cuttings from coal mines for the manufacture of gas. Many years ago certain capitalists proposed to utilize machine cuttings and other unmarketable products from certain Ohio mines for the manufacture of coal products. I did some engineering work for them, and from experiments made on these machine cuttings they should be as desirable for gas making purposes as any other fine coal. From the mines experimented on, the percentage of sulphur and other foreign matter contained was less than for an average sample throughout the thickness of the coal seam, as the cut was made through good coal. It is hard to quickly carbonize slack, as the heat does not readily penetrate it, but outside of the extra time and consumption of bench fuel it should make good gas, and from good caking coal should make coke fully equal if not superior to lump or run-of-mine coal. The fineness of much of this slack would insure a greater density of the coke made from it.—EDITOR."

No. 62. "Why do some gas engineers place the first scrubber between the tar extractor and the condenser, instead of placing the condenser between the tar extractor and the scrubber, as is the usual practice?"

"In California some engineers maintain in theory and practice that two scrubbers will displace a scrubber and condenser of approximately the same size, especially where heavy oil is used. As a condenser costs about three times as much as a scrubber of the same capacity, there is quite a saving in doing this. I have always supposed that the scrubber was sometimes placed before the condenser in order that less tar would be carried into the latter, also to partly cool the gas before it reaches the condenser.—C. O. G. MILLER."

"This question was in last year's Box, and was inspired by a constructing engineer regarding an installation made by the writer. This year he has sent a particular request that this question be answered. Lack of time prevents any extended consideration of this matter. Briefly, I may say: This arrangement secures the removal of a greater amount of sulphur, and as considerable heat is generated in the first washer due to chemical changes, it is sometimes necessary to remove this heat to enable the last washer or scrubber to do effective work in the removal of ammonia. Later I will try to give a more extended description of the results obtained.—EDITOR."

No. 63. "Can anyone give a table showing the vapor carrying capacity of blue water gas for benzol vapor at different temperatures?"

"The amount of benzol vapor that can be carried by blue water gas will be but slightly less than that due to the normal vapor tension of benzol at different temperatures.—A. B. SLATER, JR."

Temperature. Degs. C.	Temperature. Degs. F.	Tension Millimeters of Mercury.	Per Cent. Normal Pressure.
10	14	14.97	1.94
0	32	26.52	3.50
10	50	45.19	5.94
20	68	74.13	9.75

"The table shows the percentage of benzene vapor retained by any gas or mixture of gases. All gases have the same vapor carrying capacity. It is simply a matter of temperature and pressure.—ROBERT LINDSEY."

"I append a table (calculated from Landolt and Boernstein's tables) showing the amount of benzol vapor which blue water gas will carry at different temperatures:

Degs. F.	Per Cent. C_6H_6 (by volume).	Degs. F.	Per Cent. C_6H_6 (by volume).
4	76	50	5.95
5	1.16	59	7.75
14	1.70	68	9.95
23	2.41	77	12.62
32	3.34	86	15.85
42	4.48		

—CLARENCE S. LOMAX."

"The following table, showing the vapor tension of benzene, is from determinations made in the Milwaukee laboratories. The sample operated on was a 'chemically pure benzene' of the market, and was subsequently found to contain thiophene; the determinations were made hurriedly to supply data for a calculation—the truth is very closely approximated, however:

Degs. F.	Mm.	Degs. F.	Mm.
20	18.2	60	60.1
30	24.0	70	82.7
40	31.5	80	115.3
50	43.4		

"To find the percentage of benzene by volume, a gas like blue water gas will carry at any given temperature and standard atmospheric pressure, divide the vapor tension of benzene for that temperature by 760. Thus, at 60° F. the saturated gas would contain $\frac{60.1}{760}$=.079, or 7.9 per cent. benzene.—H. B. HARROP."

No. 64. "Will the vapor carrying capacity of blue water gas for benzol vapor be reduced if gas is already saturated with water vapor?"

"The carrying capacity of blue water gas for benzol vapor will be

but slightly, if any, reduced by the presence of a saturation of water vapor.—A. B. SLATER, JR."

"No. The pressure of the vapors retained in a gas which has been saturated by two immiscible liquids (such as benzene and water) is the sum of the vapor tensions of the benzene and water at the temperature at which the gas was saturated; so that blue gas saturated with water vapor would retain as much benzene as if there were no water present. —ROBERT LINDSEY."

"No. A very concise and easily comprehended statement of the principles involved in this interaction of suspended vapors will be found in 2nd series, 1901, Question No. 8, of the 'American Gas Light Association Course' papers.—H. B. HARROP."

"Owing to the fact that benzol is almost insoluble in water (and water in benzol), there is almost no reduction in the amount of benzol vapor carried by blue water gas, if the gas is saturaied with water vapor.—CLARENCE S. LOMAX."

No. 65. "Has coal gas a greater affinity for water vapor than for benzol vapor?"

"If the word 'affinity' means vapor carrying capacity, would say that the carrying capacity of coal gas for water vapor and benzol vapor will be directly proportional to the relative vapor tensions, the vapor tension of benzol being very similar to that of water; that is, the curves are about the same shape and when plotted lie very close to each other, the benzol, however, having higher vapor tension for the same temperatures.—A. B. SLATER, JR."

"Coal gas would retain more benzene vapor than water vapor on account of the former's higher vapor tension.—ROBERT LINDSEY."

"Coal gas has a far greater affinity, or raiher solvent power, for benzol vapor than for water vapor.—CLARENCE S. LOMAX."

"Taking the tension of water vapor as 50° F. = 9.2 mm., 60° F. = 13.1 mm., 70° F. = 18.6 mm., compare answer to No. 63.—H. B. HARROP."

No. 66. "Will blue water gas, carburetted with benzol vapor, drop any portion of this vapor to take up water vapor?"

"Blue water gas carburetted with benzol vapor will drop none of it on account of water vapor absorption.—CLARENCE S. LOMAX."

"Blue water gas is usually at saturation with water vapor but not with benzol, and, therefore, would not drop any benzol to take up water vapor, nor would it even if the water vapor were not at saturation. To construct the curve of vapor tension of benzol, I may offer the following data, the curve to be constructed with ordinates of centimeters of mercury and abscissæ of degrees centigrade:

Melting Point.		Boiling Point.	
Degs. C.	Cm.	Degs. C.	Cm.
6	4.5	80.4	101.5
10	7.6	90	134.0
20	12.1	100	172.0
30	18.4	110	224.0
40	27.1	120	283.5
50	39.1	130	353.0
60	54.7	140	434.0
70	75.4	150	523.0
80	....	160	.....

"With this table I may quote from a paper on coal gas treatment, which I read some time ago, as follows: 'As we have a mixture of vapors to deal with, it is well to note that the partial tension of each component of the mixture is always slightly less than the amount of its respective vapor tension when alone at the same temperature and pressure. With this qualification, Dalton's law of vapor tensions holds practically good for our range of temperatures; that is, in a space already occupied by a gas, a liquid ultimately evaporates to the same extent as in vacuo, the process being merely more slow.'—A. B. SLATER, JR."

No. 67. "How can furnace fuel be saved in coal gas benches, other than by regenerative methods?"

"Tap bench flue at lowest point, carry waste gases under steam boiler, and 20 per cent. of the fuel in the furnace will be saved, and at the same time give a higher heat on the bench, providing there is a chimney to produce a fair draught. A single bench will produce from 5 to 10-horse power from the steam thus made. Have had fine success in this line for 22 years.—FRANK N. DAVIS."

No. 68. "What is the best and most efficient method of setting a plain coal gas bench of 5 or 6 retorts?"

"In our plain settings of 6's the retorts are 16 inches by 26 inches by 9 feet, and carbonize 416 pounds of coal in 6 hours. These retorts are 2 feet wide and 3 feet high, and are constantly maintained at a temperature sufficiently high to produce 4.70 cubic feet of gas per pound of coal. Choked standpipes are almost an unknown quantity; naphthaline deposits in general hardly appreciable, and at the works, none. These retorts are built in such a manner that all the heat from the furnace rises and passes to the rear end of bench, then comes forward to the front, passes down to and under bottom retorts, then to the rear end and to the stack. The nostrils or spaces between the saddle tiles, upon which the middle and upper retorts rest, are closed tightly, except the rear one, which is left open; about 15 inches space between last saddle tile and rear wall of bench. This latter is the only exit the heat has for eventually reaching the stack. So it can be readily seen that the interior of the bench receives all the heat, and also that the absence of flame in our stacks is indicative of that which is most essential—perfect combustion.—E. J. CURLEY."

"I should say a bridge wall setting for a plain bench of 5 or 6 retorts gives most satisfactory results.—HENRY I. LEA."

(To be Continued.)

[Report, as Furnished by the Secretary.]

PROCEEDINGS OF THE CONGRESS OF GAS ASSOCIATIONS OF AMERICA.

HELD IN LIBRARY HALL, HALL OF CONGRESS, LOUISIANA PURCHASE EXHIBITION, ST. LOUIS, MO., WEDNESDAY AND THURSDAY, JUNE 15 AND 16.

WEDNESDAY'S SESSION, JUNE 15.

Mr. Rollin Norris, of Philadelphia, President of the American Gas Light Association, called the meeting to order at 10:40 o'clock, and said:

I have the honor of calling to order the first Congress of American Gas Associations, and in the name of the Gas Associations of America, I bid you each and all a hearty welcome. As explained in the printed notices of the Congress, the sessions will be presided over in turn by the Presidents of the various Associations taking part in the Congress, and before turning the meeting over to one of these Presidents while I read my formal address I wish to say a few words about the way this Congress happened to be held. At the meeting of the Council of the American Gas Light Association, last October, one of the members, who also held a prominent official position in the Western Gas Association, presented a resolution favoring the holding of a Congress of the Gas Associations of America, in connection with the St. Louis Fair, and urging the appointment of a committee to consider the possibility and advisability of attempting such a Congress. This committee was appointed, with Mr. C. J. R. Humphreys as Chairman, and in due time reported favorably on the proposition, and the committee was entrusted with the task of taking the Congress in hand, issuing invitations to the other associations to take part in the Congress, and in general shouldering the responsibility of the arrangements for the meeting. In this work which they have so well and thoroughly done they were ably assisted by the man to whose initiative the calling of the Congress is primarily due. It is, therefore, with especial pleasure and a sense of the fitness of things that, while I am reading my address, I turn this Congress over to its originator, and I introduce to you a man who needs no introduction—a man whose name is known all over the gas world as that of one whose original mind is most fertile in ideas, and who has rare courage and ability to carry these ideas into successful and triumphant practice. I introduce to you the President of the Western Gas Association, Mr. Frederick H. Shelton.

The President (Mr. Shelton)—Gentlemen, you will please listen to the reading of the address by Mr. Rollin Norris.

Mr. Norris then read the following

OPENING ADDRESS.

In addressing a Congress of American Gas Associations, it would seem particularly fitting to say something in regard to the unsolved problems of our profession, and to indicate some of the lines along which it is possible that further progress may lead us. While much has been done in the past in the way of improving and cheapening our product, the future is rich in possibilities of further increase, and it is these possibilities that give to the profession of gas engineering its absorbing interest to us. We will consider in turn some of these lines of possible progress.

We will first take up the possibility of reducing the cost of gas by the use of cheaper raw materials. The ordinary generator fuel for water

gas is anthracite coal, oven coke or gas coke. While it is possible that in the near future we will see some reduction in the cost of anthracite, and a considerable reduction in the cost of oven coke, we can look for no permanent and material reduction in the cost of these two materials, or in the cost of gas coke, which varies roughly with the cost of these other forms of smokeless fuel.

Pea coal, or other small sized anthracite fuel, offers us a possible generator fuel at a smaller cost per pound of carbon than the ordinary sizes, and it is quite possible that, by the use of a larger generator and specially designed grates, this cheaper material can be used to advantage, and the interest on the slightly greater cost of apparatus would not be important.

The use of coke breeze or other fine fuel in the form of briquettes is also a possibility in some places, which would seem to promise some economy.

There are considerable sections of the country where soft coal is locally produced at a price materially less than that of anthracite or coke, and the use of this soft coal in generators is a field which it seems to me has not yet been fully worked. The Loomis, the Rew, and the Rose-Hastings processes have all handled this material with a certain degree of success, and although they have been almost if not entirely displaced by apparatus using hard generator fuel, I cannot believe that the last word on this subject has yet been spoken.

There seems no prospect of any material reduction in the cost of boiler fuel per ton, or of finding any substitute for the kinds of fuel now used. Tar can be successfully used for boiler fuel, but eventually this residual ought to be made too valuable for other purposes to allow of using it under our boilers.

The most important item in the cost of water gas is the price of oil, and while the price of this material in the past has varied in a rather unsatisfactory way, the material itself is evidently so widely distributed that it would seem unlikely that the price can advance much beyond its present figure; but at the same time as long as the conditions of this industry allow the price to be maintained at a point just short of where it would pay the gas engineer to go back to the production of coal gas, we can, I fear, look for no very material permanent reduction in the price of oil.

The discovery of large quantities of oil at or near the seacoast, where water transportation would be possible, would simplify this problem for the large seacoast cities, and incidentally, in so far as the price of oil depends upon supply and demand, tend to reduce the price of oil to the inland cities by reducing the seacoast demand for inland oil.

Referring to gas coal, here again, aside from fluctuations due to variation in demand and the waves of prosperity and adversity that sweep over the country, we can look for no material reduction in the cost of raw material.

The possibilities in the way of cheaper raw materials, therefore, are not particularly promising or important for either water gas or coal gas.

The conditions which make for a minimum consumption of generator fuel per 1,000 feet of water gas made are, that during the blow we must burn as large a proportion as possible of our carbon to carbonic acid, and of the heat thus generated the amount escaping from the generator as sensible heat should be a minimum. These conditions are met with when the generator is at a low temperature.

During the run, however, we should decompose a maximum proportion of the steam with a minimum proportion of carbonic acid, and this calls for a hot fire. In other words, the conditions for greatest economy during the blow are the exact opposite of those for greatest economy during the run, and the actual point of net maximum economy lies between the two extremes.

An ordinary Lowe water gas apparatus demands that a certain amount of heat be stored in the fixing chambers during the blow, and the necessity for supplying this heat roughly fixes a minimum limit beyond which it is impossible to get much reduction in generator fuel per 1,000, unless we can in some way return to the apparatus the heat now wasted as sensible heat of escaping products.

In this connection the Dellwik process naturally comes to mind, but this so-called process is, it seems to me, merely a sort of "codification" of already existing knowledge, and an application of this knowledge to the special problem of producing an uncarburetted water gas with a minimum fuel consumption, unhampered by the necessity of fixing carburetting oil.

Steam boilers have, when properly constructed and operated, quite a high efficiency, and it would seem that if we are to look for any reduction in the amount of boiler fuel used it must be due either to the utilization of some such waste as the heat of our escaping products, or we must in some way reduce the consumption of steam per 1,000.

Our generators now use about 30 to 32 pounds of water per 1,000 feet of gas made, and of this steam only 50 per cent. is actually converted into gas. In other words, if we decomposed all the steam admitted to the generators, it would result in a reduction of about 15 pounds of steam per 1,000 feet of gas made, or, roughly, a saving of from 2 to 2½ pounds of boiler fuel per 1,000.

The proportion of steam decomposed during the early part of the run is much larger than during the last few minutes of the run, and this seems to point towards the desirability of shorter runs, and possibly to a graded admission of steam, instead of following the usual custom of admitting steam at a constant rate throughout the entire run. The exhaust steam from our blowing engines amounts to from 15 to 30 pounds of water per 1,000 feet of gas made, and while this heat is at present used in a more or less intermittent way for the heating of feed water, and for miscellaneous heating around the works in winter time, it would seem that it ought to be available for use in the generators. It is quite possible that on account of the large amount of entrained water carried by this exhaust steam it would have to be subjected to some reheating action, and this could readily be done by passing it through a heater in the take-off pipe.

With our present apparatus we seem to have reached about the limit of efficiency, and we cannot express much increase by any modification of heats carried. Further increase in efficiency may result from the application of some such principle as that employed in the Peebles process, by which an endeavor is made to break up a small proportion of the oil into permanent high candle power hydrocarbons, and then, by condensing out the condensable vapors and treating them again, the final result is supposed to be that a larger proportion of the oil is converted into these desirable hydrocarbons than is the case when, as in ordinary practice, we endeavor to complete the gasification of the oil in one treatment. A synthetic production of permanent hydrocarbon gases of greater or less illuminating value offers some promise, but here we get into the domain of elaborate chemical research where prophecy is especially dangerous.

There is more or less ferment among coal gas makers just now in regard to the best size and shape of retorts, style and arrangement of setting, and horizontals vs. inclines, but there is really nothing radically new in these matters or any promise of marked improvement over the best results that have already been attained at various places. It would, therefore, appear that, if we are to look for important advance in this branch of our business, it will be along some such radical lines as the use of very small retorts and short charges, the retorts probably being charged and discharged mechanically.

The Settle-Padfield process may and may not lead to important developments in coal gas practice, but it is along some such fundamentally changed lines as these that we must look for any large improvement in coal gas manufacture.

Increased knowledge of what happens to the gas during the process of condensation may lead to improved methods in this field which will enable us to get higher candle power from our present coals, as it is one of the peculiarities of the process of condensation that the vapors coming down in the liquid form bring down in solution a certain proportion of hydrocarbons which are normally gaseous, and would remain in the gas if they were not thus carried down by the condensing tars.

A more promising field for possible economy lies in the reduction in the wastes of the process as represented in the sensible and potential heats of the escaping blast products, and the sensible heat of the finished gas leaving the superheater.

In 1891 I had the honor of reading before the American Gas Light Association a paper on "The Theoretical Effect of Preheating Blast Steam and Oil in Water Gas Manufacture," in which I went somewhat fully into the possibilities of economy along these lines, and I will quote to a greater or less extent from this paper, the constants in which are taken from that classic in water gas literature on which the advance in the technical side of water gas manufacture has been so largely based. I refer, of course, to the paper read by Mr. Arthur G. Glasgow, before the American Gas Light Association, in 1890, entitled, "The Practical Efficiency of an Illuminating Water Gas Set."

The sensible heat of the escaping carburetted gas carries off about 35,000 heat units, which is equivalent to about 2.5 pounds of carbon per 1,000 feet of gas made, and the heat carried off by the escaping blast products amounts to about 75,000 heat units, or 5.5 pounds of carbon. In other words, the sensible heat of the carburetted gas and blast products amounts to an equivalent of about 8 pounds of carbon, or, roughly, about 9 pounds of generator fuel per 1,000. The sensible heat can be utilized for preheating the steam and oil and blast, or actually generating the steam.

Steam has a small heat carrying capacity, and the direct saving to be expected from superheating it would be from ¼ to ½ pound of coal. The capacity of oil for absorbing heat is also small, unless the preheating be carried far enough to evaporate part of the oil, and the heat to be returned to the set due to raising the temperature of the oil 500° would be roughly equal to only a little over ½ pound of coal.

Preheating the blast offers a more promising field, and the saving to be thus effected, assuming that we can design a blast heater which would be satisfactory, is from 2 to 8 pounds of coal per 1,000 feet of gas made, due to the heat actually returned to the apparatus by the hot air. There would also be an additional saving of the heat usually lost during the run, the blow in re-evaporating, and in decomposing the steam condensed out in the lower part of the fire during the run, as with preheated blast the ash temperatures would be normally above the boiling point of water. There would be other incidental economies, such as the more complete combustion of coal, a smaller formation of cinder, involving less frequent cleaning of fires, and also a shorter time required for the blow, and consequent increase in the daily capacity of the set.

There is, however, another field for the utilization of this sensible heat of escaping blast products which should be borne in mind. As previously stated, the maximum direct saving to be expected from preheating steam is from ¼ to ½ pound of coal, but it seems entirely practicable to utilize the waste heat of the escaping blast products for generating the steam required in the sets, and this, of course, would give us a much larger possible heat absorption than simply preheating the steam. The heat carried by the escaping blast products is sufficient to evaporate about 75 pounds of water per 1,000 feet of gas, and the steam required in the generators is about 32 pounds per 1,000 feet of gas made, so that the blast products ought to be able to supply the generators with all the steam they need, and leave a possible margin for other purposes.

The usual way of endeavoring to save the heat of the escaping blast products is by the use of a multitubular boiler, and some recent experiments with an apparatus of this sort showed an evaporation of about 30 pounds of water per 1,000 feet of gas made. A steam generator which has certain advantages over the multitubular boiler is a checker filled chamber, somewhat like an ordinary superheater, through which the escaping blast products could be passed, and in which any excess of CO could be burned by the admission of additional secondary air. During the run, hot water could be sprayed into this chamber in regulated quantity, and be converted into steam which would be superheated and passed to the generators. Exhaust steam, as previously mentioned, could be used to supply part of the steam needed, and in passing through this checker filled chamber it would be freed from entrained water and be superheated.

Mr. Glasgow, in the paper already alluded to, gives the loss by radiation and convection under the conditions of his experiments as equivalent to the energy of about 2 pounds of coal, and it would seem possible to save a portion of this loss by an air jacket around the shells through which the blast can be passed on its way to the sets. This construction has been used by Mr. H. H. Edgerton, at Danbury, Conn., and elsewhere.

The wastes in coal gas practice are somewhat more complicated, and in a way harder to control. It would seem that the loss by radiation cannot be largely reduced by any practicable method, but the total heat escaping, as sensible heat of chimney gases, is large in the aggregate, and would seem to be more than is required for the production of the necessary draft for the furnaces.

These waste chimney gases carry also a certain amount of potential energy in the form of H_2O resulting from the use of steam in the fires, and this loss could be reduced by returning a portion of the blast products through the fire instead of steam, the CO_2 serving as a heat carrier from the furnace to the combustion chamber instead of H_2O. This is not unknown in producer gas practice, and has, I believe, been experimented with to a greater or less extent in coal gas benches.

The use of machinery in larger works, and the simplifying of such machinery so as to cheapen it and put it within the reach of the smaller works, offers some hope of reduction in labor costs to compensate for the general tendency toward increased wages and shorter hours, but, except in coal gas, the margin for saving in labor per 1,000 is not very great in well conducted works.

Purification has reached a point where, with the proper apparatus, the total cost for material and labor is very small, and the principal cost of purification at present is the interest on the cost of the purification plant, to which allusion will be made later.

It is quite possible that we may see some considerable advance in the way of increasing our returns from residuals. The principal residual in water gas manufacture is, of course, tar, and I believe that there is a fertile field for investigation in the utilization of this residual by separating the tar into its various distillates, and working up uses for this special material. This, however, is a subject which demands an amount of specialization and skilled research not usually available except for the largest works, but it is a subject which would seem to commend itself as a suitable one for association work, if we ever reach the point where the gas industry as a whole would see the advantage of contributing to the support of work of this sort for the general good of the profession.

I have spoken so far only of ordinary water gas and coal gas processes, but there are other processes which, in the course of events, may have an important bearing on our business. Straight oil gas in the present state of the art seems useless except for very small installations where the selling price per unit is high, but a very low priced supply of oil might well alter these conditions.

Producer gas is so low in heating value as to be unpromising in its possibilities.

Straight water gas enriched with benzol or its equivalent does not seem to be adapted to American conditions.

Acetylene is used in between 100 and 150 small towns and settlements in the United States for lighting, but the average number of meters supplied is only 30 to 40, and the price of gas runs from $10 to $15 per 1,000, so, in spite of the number of places where it is used, it may be said to have no direct bearing on the gas industry as a whole; but if acetylene or its equivalent could be produced at a sufficiently low cost, it would very materially cheapen our product.

Coke oven gas is essentially a process of making coke with a certain or uncertain amount of gas as a by-product. Under certain conditions it certainly does have an important local importance as a source of partial supply of gas, but in the nature of things the process cannot be generally utilized.

If we could get a sufficiently cheap supply of oxygen which would be practically free from the presence of nitrogen, the entire gas business would be revolutionized, as we would be able to manufacture a sort of producer gas which would be practically free from non-combustible and which would carry in the form of gas almost the entire heating value of the fuel from which it was made. An unlimited supply of oxygen not combined with other elements is available in the air, and there would seem to be no reason why the advance of science should not eventually give us some way of straining out the nitrogen, so as to leave us the oxygen for our purposes.

In this connection I would refer you to two editorials on this subject in the *Progressive Age*, March 16 and April 15, 1891.

Better utilization of our product is equivalent to a reduction of price, and the prospects for improved appliances for the utilization of gas are good. The incandescent burner, with its high lighting efficiency, is being constantly improved and cheapened, and its increasing use is making us more and more independent of the flat flame candle power of the gas we send out, and we should be able to expect still further improvements in this system of lighting. Gas stoves for cooking are rapidly coming into almost universal use in summer, and no radical change or improvement in their design seems probable.

The efficiency of gas heating appliances when properly designed is already very high, and is only limited by the necessity for getting rid of the products of combustion, when the rate of consumption is high. But the cost of gas made by present processes is so high that there seems no prospect of our being able to do any large proportion of our heating work under present conditions. The discovery of a sufficiently cheap method of isolating oxygen, however, as already discussed, would practically wipe out of existence our present system of heating houses by isolated coal furnaces, as it would enable us to deliver in a gaseous form nearly all of the heat of the coal.

Up to this point I have spoken exclusively of the technical side of our problem and the possibility of reducing that part of the cost of our gas represented by material and labor. There is another phase of this question, however, which is perhaps equally important. The actual cost of gas as delivered to the burner is represented not only by the cost of material and labor entering into its manufacture and distribution, but to this must be added the interest on the investment in the plant required for its production and distribution. Speaking roughly, interest at 6 per cent. is about equal to the entire holder cost of the gas, and at 10 per cent. it would be almost double the holder cost. In other words, a reduction of 10 per cent. in the cost of plant per 1,000 feet of gas sold would reduce the actual burner cost of the gas an amount equal to from 10 to nearly 20 per cent. of the holder cost. The interest charge on the investment can be reduced by lessening the cost of the

plant by the invention of cheaper apparatus for its manufacture and distribution, by the invention of low cost apparatus which will enable the gas to be made at the time of demand, thus reducing the amount of necessary investment in holders, or any improvement in methods which tends to produce high yields and rapid make from existing apparatus.

The interest charge will also be reduced by any development which tends toward a more uniform send-out per hour and per day, thus increasing the amount of gas that a given plant can sell per year; and larger sales per square mile of territory will also reduce this item of interest charge by reducing the cost of the distribution plant per unit of gas sold.

I have spoken of the fact that the cost of gas is the cost of labor and material entering into its manufacture, plus interest on the necessary investment. It is evident, therefore, that the cost of gas will vary according to the rate at which the money required for the construction of the plant can be borrowed, and the lower the rate of interest at which the gas company can borrow money the lower the cost of the gas. As, in the long run, the price of gas depends upon the cost of gas, it would seem to be to the advantage of the public in general to encourage the development of conditions which, by making gas investments additionally safe, will correspondingly reduce the rate of interest at which money can be borrowed by gas companies.

Gas companies should be able to borrow their capital at a very low rate of interest, if the conditions were such as to insure the absence of possible destructive competition from other gas companies, and the presence of conservative financing which would make the amount on which interest must be paid fairly representative of the cost of the plant. As additional conditions, tending to the stability of gas investments, and consequently to the power of borrowing capital at low interest rates, there should be some equitable and, if possible, automatic system of regulating the selling price of gas that would protect the company alike from the raids of the temporary politician and from the effect of unusual increases in the market price of labor and materials. To these conditions, however, if we wish to insure a maximum technical progress, and an eventual minimum price for gas, must be added the condition that exceptional energy and ability in the management must be able to realize exceptional returns.

Where the system of municipal or State control is such that the public, and only the public, gets the advantage of any efficiency in the management above the average, the personal interest in improvement is wiped out and the industry as a whole will no longer attract the services of the best intellects.

A satisfactory solution of these problems belonging really to social science I believe would do as much toward reducing the price of gas and maintaining the standard of technical progress as is promised by the strictly scientific side of our business, and we may well devote a part of our energy toward helping to solve these difficulties.

It is not claimed that these problems to which I have alluded are the only ones that confront our business, but they serve to show roughly the field before us, and perhaps to indicate some of the lines along which progress is possible.

To the younger men among us a realization of the amount that we do not know should be a spur to redoubled effort to surmount these difficulties, and we should be strengthened by that high conception of duty that recognizes the obligation resting upon every man to do what he can to advance the general cause of knowledge and truth.

The gas business is in a sense young, and the pioneers blazed the untrodden path to success with a skill and an energy and a heartiness that challenge our admiration and wonder. Starting from the vantage point thus won for us by our predecessors, we rest under a solemn obligation to advance the standard of knowledge still further.

Reduced cost of gas means more than simply increased earnings—in the long run it inevitably means cheaper gas for the public, and consequently a more general extension of the comfort resulting from its use.

The inspiration of the engineer comes not only—and not chiefly—from the financial returns that his efforts bring to himself and to the company, but to the realization of the joy that comes from helping to do the world's work with a smaller expenditure of energy in the form of labor and material. To add to the comfort and happiness of mankind by bringing conveniences within the reach of a widening circle is an end in itself worthy of our manliest effort, and in itself a reward worth all the cost of our life work.

Toward this progress gas associations and their work should be most effective factors, and every man should feel it his duty and his privilege to bring to these associations a record of such of his work as will aid his neighbor and add to the general fund of human knowledge.

The most effective way for associations to carry out their work is a subject that will be presented later by the versatile Editor of the Question Box of the Ohio Gas Light Association, and I will close by saying that good association w ork, like any other good work, is hard work, and that the best results are to be obtained when all are striving loyally for the general good.

Discussion.

The President (Mr. Shelton)—Gentlemen, you have just listened to an address by Mr. Norris, characterized by broad views and a large scope in the variety of subjects that have been treated of in it. The address is brimful of knowledge, of suggestions, of thoughts and points which, step by step, as they are taken up and worked out to a successful conclusion, will tend toward the advancement of the gas business the world over. The address to my mind amply reflects the propriety of the choice which was made of the gentleman who should open this Congress—it reflects, to my mind, the suitability of the current leader of the American Association; and although that leader is a young man—by his own assertion—it would appear from the number of topics he has touched on and the variety of things he has covered that he must be like the little pickaninny who, when asked how old she was, replied, "I am 10 years old in years, but judging by the fun I have had, I am 50 years old." I think, judging by the things Mr. Norris has covered and the ideas he has brought to our attention in that paper, he must be 120 years old. One great attraction about this Congress, that has never been about a previous meeting of a Gas Association, is no "precedent" has to be followed. We have absolutely an untrodden course before us, without precedent. We shall have to establish our own precedents, which we hope will be followed in other Congresses from time to time. I think the proper thing to do would be to have Mr. Norris's address referred to a committee to make a report upon it. I say that for the reason it embodies so many points it is almost impossible to discuss it intelligently without a copy in our hands and an opportunity for its perusal; and it seems to me a motion to have the address referred to a committee who shall report to-morrow any recommendations they may see fit to make concerning the publication of Mr. Norris's address, or its dissemination, so that we shall have an opportunity to go over it, would be the proper method to pursue.

Mr. T. D, Miller moved that the address by Mr. Norris be referred to a committee. (Seconded and adopted.)

After some discussion the President put the motion, declared it carried, and appointed Messrs. E. G. Pratt and A. E. Boardman as the committee.

[To be Continued.]

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. A. C. Anderson, who has been representing the Stanley Instrument Company's foreign interests for some time, has returned to the States, where he proposes to remain permanently. It is quite on the cards that he will soon be in active work again in the gas industry.

Sometime next December the Boston Edison Electric Illuminating Company will issue the balance of the new stock (something like 10,000 shares) the putting out of the total of which was authorized by the Board of Gas and Electric Light Commissioners quite awhile ago. The upset price is $200 per share.

Mr. R. H. Lawlor, for the past year or more Superintendent of the Michigan City and Northern Indiana Gas Company, has been appointed Superintendent of the East St. Louis (Ills.) Light and Gas Company, of which concern Mr. I. C. Elston was recently elected President and General Manager.

Mr. Lawlor's successor at Michigan City is Mr. N. C. Fancher.

The proprietors of the Warren (O.) Gas Company have made many needed improvements on their office quarters. Not the least of these is a handsome showroom for the display of gas appliances of all kinds.

Notice of the incorporation of the New York and Queens County Gas Company, of New York city, was recently filed. Its capital is put at $600,000, and the nominal Directors are: C. G. M. Thomas, J. F. Eagles and H. L. Snyder. There is nothing particularly new, however, in this announcement, unless it portends a turning over of the Flushing, L. I., gas properties to the Consolidated Gas Company, of New York.

AT the annual meeting of the shareholders in the Milwaukee (Wis.) Gas Light Company, the expected happened. The election for Directors resulted in the naming of the following: O. C. Fuller (who succeeds G. C. Pabst), E. McMillin, F. G. Bigelow, H. C. Payne, S. M. Greene, A. Ludeke, J. F. Murphy, Wm. Sieg and E. G. Pratt; President, E. McMillin; First Vice-President and General Manager, E. G. Pratt; Second Vice-President, S. M. Greene; Secretary and Treasurer, Ewald Haase; Chairman Board of Directors, F. G. Bigelow. The Directors declared a semi-annual dividend of 3 per cent.

AT a recent meeting of the Rutherford (N. J.) Council, Mr. Evans presented the following preamble and resolutions which, upon motion, were unanimously adopted:

"*Whereas*, It appearing from the contract under which the Gas Company [presumably the Gas and Electric Company, of Bergen County, N. J.] is furnishing gas to the citizens of the Borough under an ordinance of the Council, that said contract requires that it should furnish fuel gas at the rate of 50 cents per 1,000 cubic feet, it is hereby

"*Resolved*, That the said Gas Company be ordered hereafter, on the request of any citizen desiring to use fuel gas within the said Borough, that it shall attach a separate meter for the measurement of the gas so used, and that the Borough Clerk be instructed to notify the said Gas Company in writing of the above action." Gas for cooking and power, and heating in Rutherford at 50 cents per 1,000 cubic feet. Not yet awhile, we fear.

AND here is another New Jersey "ordinance resolution," which was adopted by the Jersey City Board of Aldermen at the instance of Ald. Hart:

"*Whereas*, It has been deemed necessary for the protection of the public to appoint inspectors of weights and measures and water meters by the city of Jersey city; and

"*Whereas*, While not imputing any wrong doing to the Public Service Corporation, yet it would seem that it is necessary, in order to prevent errors from defective meters, that the city should appoint inspectors, whose duty it would be to see that said meters registered correctly; and

"*Whereas*, Numerous complaints have been made against excessive charges for the use of gas, chargeable to the wrong registering of meters and little or no redress vouchsafed to those who complain, I, therefore, deem it in the interest of a long suffering public to introduce a measure for relief which has long existed in other cities, to wit, public inspection of gas and electric meters; therefore be it

"*Resolved*, That the Clerk of this Board be instructed to communicate with the Corporation Counsel, asking him to render an opinion to this Board as to the jurisdiction of this Board in the herein mentioned matter."

THE plant of the Boise City (Idaho) Gas Company has been completed, and gas is now being satisfactorily supplied therefrom. President Ross and his associates are much pleased over the way in which the Company starts in, and they are all satisfied that the venture is bound to be a paying one.

SHERIFF E. F. SLEDHAM, of Wilmington, Del., advertises that the plant of the Oxy-Hydrogen Gas Company of that city (it is one of the ex-properties of J. Edward Addicks) will be sold at public auction at 12 A.M., the 26th inst.

THE Massachusetts State Board of Gas and Electric Light Commissioners has handed down the following decision in the application of the Marlboro-Hudson Gas Company, for the right to increase its capital stock:

"This Company represents a union of the Marlboro Gas Light Company and the Hudson Gas Light Company. Its floating debt includes about $8,500, incurred on additions to the plant of the Marlboro Company prior to the consolidation, and about $8,900 expended by the Hudson Gas Light Company in the construction of its plant in excess of the proceeds of stock approved by the Board. Further extensions by the petitioner now in process of construction and planned will probably cost upwards of $25,000.

"That the Board hereby approves of the issue of the Marlboro-Hudson Gas Company in conformity with the requirements of law relating thereto, of 400 shares of new capital stock of the par value of $100 each; the proceeds of said stock to be applied to the following purposes and to no other, to wit:

"The proceeds of 85 shares to the payment of the indebtedness of the Company incurred for additions made by the Marlboro Gas Light Company to its plant prior to May 1, 1904; the proceeds of 89 shares to the indebtedness on account of expenditures upon its plant by the Hudson Gas Light Company in excess of the proceeds of securities approved for such construction, and the proceeds of 226 shares to the payment of the cost of addition to the plant of the Marlboro-Hudson Gas Company, made subsequent to the 1st day of May, 1904.

"It is further ordered by the Board that the market value thereof be fixed at $100 a share.

"It is further ordered that all such shares shall be offered for sale at some suitable place in Boston, and that notice of the time and place of such sale shall be published in the Boston *Daily Advertiser*, the Marlboro *Enterprise* and the Hudson *Morning Sun*, newspapers published in the cities of Boston and Marlboro, and the town of Hudson, respectively."

THE plants and rights of the Quincy (Ills.) Gas and Electric Company have been acquired by Mr. James T. Lynn and associates, of Detroit. The officers now in control are: Directors, J. T. Lynn, F. K. Pelton, A. L. Wilkinson, J. B. Book, A. L. Stevens, M. A. Borgeman, A. C. Angle, V. N. Gurney and H. M. Campbell; President, J. T. Lynn; Vice-President, A. L. Stevens; Treasurer, A. B. Book; Secretary, F. K. Pelton. Mr. Walter A. Bixby will be retained as General Manager.

WITH the July statements for gas consumed the previous month General Manager E. C. Pratt, General Manager of the Milwaukee Gas Light Company, forwarded the following statement respecting the reduction in the selling rates:

"From and after July 1, 1904, the price for illuminating purposes will be reduced to the following schedule: For the first 1,000 cubic feet used during any one month, through any one meter, a rate of $1 per 1,000 cubic feet. For any amount above 1,000 cubic feet and up to 35,000 cubic feet used during the same month, through the same meter, a rate of 90 cents per 1,000 cubic feet. For all additional consumption over 35,000 cubic feet used during the same month, through the same meter, a rate of 80 cents per 1,000 cubic feet." The rate on fuel account and use remains as before—maximum, 80 cents per 1,000; minimum, 60 cents per 1,000. These rates are net.

MR. GORDON W. LLOYD has retired from the active management of the plants at Adrian and Hillsdale, Mich. He retains his monied interests therein, and the policy of the proprietors will be under the active control of his son, Mr. Ernest F. Lloyd. Mr. Royal Shacklette is the engineer in charge.

THE preliminary steps to putting the gas rate at Richmond, Va., at 90 cents per 1,000 cubic feet have been taken by the Municipal Light Committee.

MR. A. M. SUTHERLAND, having completed the construction of the plant at Hamburg, Pa., is now ready to go on with the erection of the works at Pen Argyl, Pa.

AT the annual meeting of the shareholders in the Louisville (Ky.) Gas Company the Directors chosen were: H. V. Loving, D. X. Murphy, F. M. Sackett, Udolpho Snead and John Stites. A disgruntled holder named Rowan Hardin attempted to defeat the regular ticket, but his shrift was short.

THE plant of the Placerville (Cal.) Gas and Fuel Company, which had been shut down for some time, is to be put in operation again.

THE regular semi-annual dividend of 5 per cent. has been declared by the Lebanon (Pa.) Gas Company.

THE Peoria (Ills.) Gas and Electric Company will extend its main system to the outlying section known as Bradley Park.

THE proprietors of the Ogdensburgh (N. Y.) Gas Company have filed a certificate announcing an extension of its corporate existence for a term of 50 years.

MR. A. G. PEIRCE, for many years a member of the Board of Directors of the Burlington (Vt.) Gas Company, died at his home in Burlington the morning of the 11th inst. He was in his 66th year.

COKE oven plants do not seem particularly successful on the flat shores of Long Island, N. Y.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

MONDAY, JULY 18, 1904.

The Market for Gas Securities.

The quotations for city gas shares show no particular change, but the latter goes to the low side. Consolidated closed to-day (Friday) at 194 to 194¼, and the actual business done for the week was light in volume. It is quite on the cards that the Westchester Lighting Company deal was arranged for some time ago, and although this trade marks the final departure of certain Pennsylvania capitalists from the local gas fields, they can well afford to retire on "the percentage" as between 1899 and 1904.

Brooklyn Union shows unmistakable signs of going ahead. It is quoted nominally at 215 to 220, but there is not a doubt that it will sell at 250 before December 1st, no matter what the result of the presidential election shall be. Washington (D. C.) gas is 292½ bid, and it will easily be 325 bid before December 1st. Peoples, of Chicago, is above the par mark, where it should remain indefinitely, and Baltimore Consolidated is 74½ bid.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

July 18.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	Capital.	Par.	Bid.	*Asked.*
Consolidated	$73,177,000	100	194	194¼
Central Union, Bonds, 5's.	3,000,000	1,000	106⅛	106¼
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	270	300
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	105¼	106
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	31	..
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	..	..
Northern Union, Bonds, 5's.	1,250,000	1,000	103½	105½
New York and East River.. Bonds 1st 5's	3,500,000	1,000	109⅛	111
" 1st Con. 5's	1,500,000	..	106	108
Standard	5,000,000	100	125	13
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	215	220
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	⅜	3/16
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	3¾	4
" " Bonds, 5's	5,250,000	1,000	12¾	..
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	101⅝	102
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	107½	109
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	74½	75
Mortgage, 6's	3,500,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co.	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99¼	100
Detroit Gas Co., 5's	921,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	67	68
" Bonds, 5's	10,500,000	..	103½	104½
Indianapolis	2,000,000	..	60	70
" Bonds, 6's	2,650,000	..	103½	106½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	..
Preferred	2,500,000	100	80	100
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218½
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¼
New Haven	1,000,000	25	64	70
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	100⅜	100½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	.
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,600,000	100	58½	58¾
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	93½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	113½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047,000	1,000	94	96
Washington, D. C	2,800,000	20	292½	295
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	230	..

Advertisers' Index.

GAS ENGINEERS. Page

A. E. Boardman, New York City 112
Baxter & Young, Detroit, Mich 112
B. E. Chollar, St. Louis, Mo 98
David Leavitt Hough, New York City 112
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Frank D. Moses, Trenton, N. J 96
Fred. Bredel Co., Milwaukee, Wis 100
Frederic Egner, Washington, D. C 98
Geo. G. Ramsdell, New York City 96 97
Geo. R. Rowland, New York City 102
Humphreys & Glasgow, New York City 113
Kerr Murray Mfg. Co., Fort Wayne, Ind 112
The Gas Machinery Co., Cleveland, O 100
The Jeffrey Manufacturing Co., Columbus, O 110
The Western Gas Construction Co., Fort Wayne, Ind.... 80
United Gas Improvement Co., Philadelphia, Pa 107
Wm. Henry White, New York City 115

GAS WORKS APPARATUS AND CONSTRUCTION.

A. E. Boardman, New York City 112
Bartlett, Hayward & Co., Baltimore, Md 113
Baxter & Young, Detroit, Mich 112
Connelly Iron Sponge and Governor Co., New York City 109
Continental Iron Works, Brooklyn, N. Y 114
Cruse-Kemper Co., Philadelphia, Pa 99
Davis and Farnum Mfg. Co., Waltham, Mass 112
Daily & Fowler, Philadelphia, Pa 116
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Frank D. Moses, Trenton, N. J 99
Fred. Bredel Co., Milwaukee, Wis 100
G. Shepard Page's Sons, New York City 112
Humphreys & Glasgow, New York City 113
Isbell-Porter Company, New York City 114
Kerr Murray Mfg. Co., Fort Wayne, Ind 112
Lloyd Construction Co., Detroit, Mich 102
Logan Iron Works, Brooklyn, N. Y 116
Quintard Iron Works, New York City 113
R. D. Wood & Co., Philadelphia, Pa 114
Riter-Conley Mfg. Co., Pittsburg, Pa 115
Stacey Mfg. Co., Cincinnati, O 115
The Connersville Blower Company, Connersville, Ind... 117
The Gas Machinery Co., Cleveland, O 100
The Jeffrey Manufacturing Co., Columbus, O 110
The Western Gas Construction Co., Fort Wayne, Ind.... 80
United Gas Improvement Co., Philadelphia, Pa 107

PROCESSES.

Bartlett, Hayward & Co., Baltimore, Md 113
B. E. Chollar, St. Louis, Mo 98
Economical Gas Apparatus Construct'n Co, Toronto, Ont. 104
Fred. Bredel Co., Milwaukee, Wis 100
Humphreys & Glasgow, New York City 113
The Gas Machinery Co., Cleveland, O 100
The Western Gas Construction Co., Fort Wayne, Ind.... 80
United Gas Improvement Co., Philadelphia, Pa 107

SCRUBBERS AND CONDENSERS.

Continental Iron Works, Brooklyn, N.Y 114
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Fred. Bredel Co., Milwaukee, Wis 100
Kerr Murray Mfg. Co., Fort Wayne, Ind 112
Logan Iron Works, Brooklyn, N. Y 116
R. D. Wood & Co., Philadelphia, Pa 114
Riter-Conley Mfg. Co., Pittsburg, Pa 115
Stacey Mfg. Co., Cincinnati, O 115
The Gas Machinery Co., Cleveland, O 100
The Western Gas Construction Co., Fort Wayne, Ind.... 80

PRODUCER POWER PLANTS.

Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
R. D. Wood & Co., Philadelphia, Pa 114

TAR AND CARBONIC ACID EXTRACTOR.

Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Fred. Bredel Co., Milwaukee, Wis 100
Stacey Mfg. Co., Cincinnati, O 115
The Gas Machinery Co., Cleveland, O 100
The Western Gas Construction Co., Fort Wayne, Ind... 80

AMMONIA CONCENTRATORS.

Fred. Bredel Co., Milwaukee, Wis 100
Michigan Ammonia Works, Detroit, Mich 96
The Gas Machinery Co., Cleveland, O 110
The Western Gas Construction Co., Fort Wayne, Ind... 80

GAS METERS.

American Meter Co., New York and Philadelphia 119
Detroit Meter Company, Detroit, Mich 119
D. McDonald & Co., Albany, N.Y 117
Helme & McIlhenny, Philadelphia, Pa 119
John J. Griffin & Co., Philadelphia, Pa 120
Keystone Meter Co., Royersford, Pa 118
Maryland Meter and Mfg. Co., Baltimore, Md 118
Metric Metal Co., Erie, Pa 119
Nathaniel Tufts Meter Co., Boston, Mass 118

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia 119
D. McDonald & Co., Albany, N. Y 117
Helme & McIlhenny, Philadelphia, Pa 119
John J. Griffin & Co., Philadelphia, Pa 120
Keystone Meter Co., Royersford, Pa 118
Nathaniel Tufts Meter Co., Boston, Mass 118

PREPAYMENT METER ATTACHMENTS.

Reeves Mfg. Co., New Haven, Conn 100

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass 112
Donaldson Iron Co., Emaus, Pa 104
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
M. J. Drummond & Co., New York City 104
R. D. Wood & Co., Philadelphia, Pa 114
Warren Foundry and Machine Co., New York City 104

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 110
Perkins & Co., New York City 110
Westmoreland Coal Co., Philadelphia, Pa 111

SPECIALTIES FOR OIL AND PIPE LINES.

S. R. Dresser, Bradford, Pa 101

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., N.Y. City 104

MAIN AND SERVICE LAYING.
Sullivan Bros., Flushing, N. Y. ... 60

GAS TAPPING MACHINES.
George Light, Dayton, O. ... 101
H. Mueller Manufacturing Company, Decatur, Ills. ... 97

CANNEL COALS.
Perkins & Co., New York City ... 110

STOKING MACHINERY.
G. A. Bronder, New York City ... 109

CONVEYORS.
Adam Weber Sons, New York City ... 108
C. W. Hunt Company, New York City ... 101
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Fred. Bredel Co., Milwaukee, Wis. ... 100
G. A. Bronder, New York City ... 109
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 112
The Brown Hoisting Machinery Co., Cleveland, O. ... 111
The Gas Machinery Co., Cleveland, O. ... 103
The Jeffrey Manufacturing Co., Columbus, O. ... 110
The Link-Belt Engineering Co., Philadelphia, Pa. ... 101
The Link-Belt Machinery Co., Chicago, Ills. ... 104
The Western Gas Construction Co., Fort Wayne, Ind. ... 80

CHARGING BARROWS & COAL WAGONS.
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 112
Stacey Mfg. Co., Cincinnati, O. ... 115

GAS ENRICHERS.
Standard Oil Co., New York City ... 71
Sun Company, Pittsburg, Pa. ... 111
The Sun Oil Co., Pittsburg, Pa. ... 111

COKE CRUSHERS.
C. M. Keller, Columbus, Ind. ... 111
Fred. Bredel Co., Milwaukee, Wis. ... 100
The Jeffrey Manufacturing Co., Columbus, O. ... 110

STEAM BLOWER FOR BURNING BREEZE.
The Connersville Blower Company, Connersville, Ind. ... 117

ECONOMIZERS.
Green Fuel Economizer Co., Matteawan, N. Y. ... 102

GAS GAUGES.
The Bristol Co., Waterbury, Conn. ... 102

GAS GOVERNORS.
Connelly Iron Sponge and Governor Co., New York City 109
Fred. Bredel Co., Milwaukee, Wis. ... 100
Isbell-Porter Co., Newark, N. J. ... 114
R. D. Wood & Co., Philadelphia, Pa. ... 114

CEMENTS.
C. L. Gerould, Bloomington, Ind. ... 68

RETORTS AND FIREBRICKS.
Adam Weber Sons, New York City ... 108
Baltimore Retort and Firebrick Co., Baltimore, Md. ... 108
Brooklyn Firebrick Works, Brooklyn, N. Y. ... 108
Henry Maurer & Son, New York City ... 108
James Gardner, Jr., Co., Pittsburg, Pa. ... 108
J. H. Gautier & Co., Jersey City, N. J. ... 108
Laclede Firebrick Mfg. Co., St. Louis, Mo. ... 108
Missouri Firebrick Co., St. Louis, Mo. ... 108
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 98
The Kreischer Brick Mfg. Co., New York City ... 108

INCLINED RETORTS.
Adam Weber Sons (Graham, Morton [England] System) 108
Fred. Bredel Co., Milwaukee, Wis. ... 100
Geo. G. Ramsdell, New York City ... 96 97
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 98

VERTICAL S'S.
Adam Weber Sons (Oscar B. Weber's Construction) ... 108
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 109
Fred. Bredel Co., Milwaukee, Wis. ... 100
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 98

VERTICAL CHARGING & DISCHARGING MACHINERY.
Adam Weber Sons, New York City ... 108

REGENERATIVE FURNACES.
Adam Weber Sons, New York City ... 108
Bartlett, Hayward & Co., Baltimore, Md. ... 113
Fred. Bredel Co., Milwaukee, Wis. ... 100
J. H. Gautier & Co., Jersey City, N. J. ... 108
Laclede Firebrick Mfg. Co., St. Louis, Mo. ... 108
Missouri Firebrick Co., St. Louis, Mo. ... 108
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 98

SELF-SEALING MOUTHPIECE DOORS.
Continental Iron Works, Brooklyn, N. Y. ... 114
Fred. Bredel Co., Milwaukee, Wis. ... 110
Isbell-Porter Co., Newark, N. J. ... 114
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 112
Logan Iron Works, Brooklyn, N. Y. ... 116
R. D. Wood & Co., Philadelphia, Pa. ... 114
Stacey Mfg. Co., Cincinnati, O. ... 115
The Gas Machinery Co., Cleveland, O. ... 100
The Western Gas Construction Co., Fort Wayne, Ind. ... 80

CHIMNEY CONSTRUCTION.
Adam Weber Sons, New York City ... 108

INCANDESCENT GAS LAMPS.
D. M. Steward Mfg. Co., Chattanooga, Tenn. ... 100
General Gas Light Co., Kalamazoo, Mich. ... 99
Geo. G. Ramsdell, New York City ... 96 97
Welsbach Company, Gloucester, N. J. ... 106

BURNERS.
D. M. Steward Mfg. Co., Chattanooga, Tenn. ... 100
Wm. M. Crane Co., New York City ... 101

LAVA GAS TIPS.
D. M. Steward Mfg. Co., Chattanooga, Tenn. ... 100

STREET LAMPS.
Thos. T. W. Miner, New York City ... 101
Welsbach Street Lighting Co., New York and Phila. ... 106

PURIFIERS.
Connelly Iron Sponge and Governor Co., New York City. 109
Fred. Bredel Co., Milwaukee, Wis. ... 100
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 112
R. D. Wood & Co., Philadelphia, Pa ... 114
Stacey Mfg. Co., Cincinnati, O. ... 115
The Western Gas Construction Co., Fort Wayne, Ind. ... 80

(*Continued on page 96.*)

POSITION WANTED
AS SUPERINTENDENT,

In a town of 30,000 or more, by a young man having 15 years' experience in the manufacture and distribution of coal gas. Now managing a plant in a town of 10,000, and has a record of 6 per cent. increase in gas sales for past two years. Address, "ADVANCEMENT,"
1519-1 Care this Journal.

Position Wanted.

COMPETENT ENGINEER of 27—three years' experience in gas manufacture and distribution—would change to desirable position. Address, "PENN,"
1519-1 Care this Journal.

Position Wanted.

COMPETENT GAS ENGINEER desires a position as superintendent of gas or gas and electric light plant. Sixteen years' experience. Competent to take entire charge.
1519-2 Address, "OHIO," care this Journal.

Position Wanted.

A young man who has had six years' practical experience with one of the largest gas companies in the country, desires position as superintendent or manager.
1519-1 Address, "ALLEN," care this Journal.

SUPERINTENDENT.

Young man, thoroughly experienced, with excellent record in manufacture and economical operation generally, desires situation. Salary to be contingent upon results actually obtained. Excellent references.
1519-eot tf Address, "MANAGER," care this Journal.

WANTED,
Position as Manager or Superintendent of Gas Plant.

I am middle aged and married. Have had six years' experience in the gas business, and can give first-class references. In my present position I have shown an increase of business every month. Address, "INCREASE,"
1518-2 Care this Journal.

WANTED,
GAS SUPERINTENDENT

For a new and growing water gas plant. Permanent position, with good prospects. Must have references and knowledge of office work and distribution. Married man preferred. Address, "J.,"
1518-2 Care of this Journal.

WANTED.

A position in a gas company is open for a gentleman who is thoroughly familiar with branch office detail; a systematizer possessing tact, ability and knowledge of accounts; one who can get the best results out of a large branch office force. Preference will be given to the applicant who has had experience in the credit department of a gas company. This is an excellent opening for a good man. State age, experience, references, and salary expected.
1516-4 "X. Y. Z.," care this Journal.

WANTED,
SECOND-HAND STATION METER,

5 or 6-foot. Must be in good condition. Address, giving necessary information, "C. H. G.,"
1517-4 Care this Journal.

FOR SALE.
Complete Gas Plant, Discarded because Outgrown.

Forty-two Mouthpieces, 19 inches by 12 inches.
Forty-two Standpipes.
Forty-two Bridgepipes.
Forty-two Dip Pipes.
Four Sections Hydraulic Main.
One P. & A. Tar Extractor, 8-inch connections.
One Rotary Scrubber, 10 sections; 10-inch connections.
Six Purifying Boxes, 8 feet by 13 feet by 3½ feet; 10-inch connections.
Twelve 10-inch Valves; bell ends.
Five 10-inch Valves; flange ends.
One 4-Box Dry Centerseal Valve; capacity about 250,000 cubic feet per day.
Ells, Tees, Bends, Etc., to connect boxes.
A Large Assortment of Pulleys, Shafting, Etc.

Address,
NEW BEDFORD GAS AND EDISON LIGHT COMPANY,
1516-5 NEW BEDFORD, MASS.

FOR SALE.

One Section Wrought Iron Hydraulic Main, with 8tiness tar take-off, for 3 benches of 6's.
One Section Main, for 4 benches of 6's.
Standpipes, Bridgepipes, Mouthpieces with Self-sealing Lids, for 7 benches of 6's.
One Sinuous Friction Condenser.
One Walker Tar Extractor.
Four Purifiers, 10 by 16 by 3; complete. Connections above apparatus, 10-inch.
One 50 Horizontal Return Tubular Boiler.

All of the above apparatus is in good condition, and to be sold, as the company has been obliged to purchase larger for its new works. Address, TAUNTON GAS LIGHT CO.,
1514-6 Taunton, Mass.

FOR SALE.

Lot of second-hand
THREE-LIGHT METERS,
in splendid condition; as good as new. Also one
NINE-FOOT STATION METER,
with a capacity of 1,000,000 cubic feet per 24 hours. Address, "VINDEX,"
1508-tf Care this Journal

FOR SALE.

Three Davis & Farnum Purifiers,
Twelve feet by 24 feet by 4 feet. Also,
One 50-Horse Power Bigelow Boiler.
All in good condition. Address,
PAWTUCKET GAS COMPANY,
1506-tf PAWTUCKET, R. I.

Utilize Your Gas Liquor.
NO EXTRA LABOR OR OPERATING EXPENSES.
IMPROVED AMMONIA CONCENTRATOR.
About 100 in use. Write to
STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

(*Continued from page 95.*)

PURIFYING MATERIALS.

Connelly Iron Sponge and Governor Co., New York City 109

VALVES.

Continental Iron Works, Brooklyn, N. Y. 114
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Isbell-Porter Co., Newark, N. J. 114
Kerr Murray Mfg. Co., Fort Wayne, Ind 112
Ludlow Valve Manufacturing Co., Troy, N.Y. 101
R. D. Wood & Co., Philadelphia, Pa. 114
Stacey Mfg. Co., Cincinnati, O. 115
The P. H. & F. M. Roots Co., Connersville, Ind. 103
The Western Gas Construction Co., Fort Wayne, Ind. 80

EXHAUSTERS.

Connelly Iron Sponge and Governor Co., New York City 109
Isbell-Porter Company, Newark, N. J. 114
Kerr Murray Mfg. Co., Fort Wayne, Ind. 112
The Connersville Blower Company, Connersville, Ind. .. 117
The P. H. & F. M. Roots Co., Connersville, Ind. 103

ELECTRICAL APPARATUS.

Wm. Henry White, New York City 115

PURIFIER SCREENS.

John Cabot, Hoboken, N. J. 109

GRATE BARS.

F. Ferguson & Son, Hoboken, N. J. 104

GAS STOVES.

American Meter Co., New York and Philadelphia. 105
Detroit Stove Works, Detroit and Chicago. 118
Keystone Meter Co., Royersford, Pa. 118
Maryland Meter and Manufacturing Co., Baltimore, Md. 118
Nathaniel Tufts Meter Co., Boston, Mass. 118

HOT WATER HEATERS.

Humphrey Co., Kalamazoo, Mich. 96

GASHOLDER TANKS.

J. P. Whittier, Brooklyn, N.Y. 102

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md. 113
Continental Iron Works, Brooklyn, N.Y. 114
Cruse-Kemper Co., Philadelphia, Pa. 99
Davis & Farnum Mfg. Co., Waltham, Mass. 112
Deily & Fowler, Philadelphia, Pa. 116
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 104
Kerr Murray Mfg. Co., Fort Wayne, Ind. 112
Logan Iron Works, Brooklyn, N Y. 116
R. D. Wood & Co., Philadelphia, Pa. 114
Riter-Conley Mfg. Co., Pittsburg, Pa. 115
Stacey Mfg. Co., Cincinnati, O. 115

STORAGE TANKS.

Stacey Mfg. Co., Cincinnati, O. 115

PAINTS.

National Paint Works, New York City. 112

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C. 100

BOOKS, ETC.

Scientific Books. 98
Self-Instruction for Students in Gas Manufacture 100
Finances of Gas and Electricity Mfg. Enterprises 98
Practical Handbook on Gas Engines. 101
Gas and Gas Works. 98
Electric Gas Lighting. 104
Coal Tar and Ammonia. 99
Gas Analyst's Manual 116
Field's Analysis, 1903. 100
Gas Flow Computers. 103
Excerpts from Reports of Gas Commissioners. 119
Directory of Gas Companies. 115
Gas Engineer's Laboratory Handbook. 114
Gas Engineer's Pocket-Book. 108
Poole on Fuels. 111
Binders. 111

GEO. G. RAMSDELL.

DRAKE'S SYSTEM OF INCLINED RETORTS. COAL AND COKE MACHINERY.

P. H. & F. M. ROOTS CO. GAS EXHAUSTERS, HIGH OR LOW PRESSURE.

AMMONIA CONCENTRATING PLANT.

AIR DEVICE for Admitting a Proper Percentage of Air into Purifying Boxes.

Governors, Gas Valves, Cast Iron Specials, Gauges, Photometers, Gas Specialties.

TELEPHONE, 3553 Spring. **530 BROADWAY, NEW YORK CITY.**

THE SUMMER SEASON

Means More Hot Baths.

Furnish your consumers the easiest, quickest, cleanest and most economical means of securing Hot Baths by recommending or selling the

Humphrey Crescent Instantaneous Water Heaters.

Price, $16 to $45, GUARANTEED.

The No. 6, price $25, here illustrated, will heat three gallons of water per minute 50° in temperature, supplying a large family at any time with all the Hot Baths wanted.

We Make Quick Shipments.

Send to-day for prices to **HUMPHREY CO., Kalamazoo, Mich.**

FRANK D. MOSES,

Long Distance Telephone, 1922, Trenton, N. J.

TRENTON, N. J.,

Long Distance Telephone, 1922 Trenton, N. J.

Constructing Engineer and Contractor.

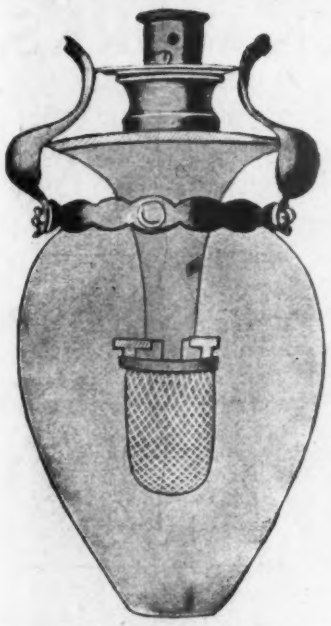
Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.

SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE

CORRESPONDENCE SOLICITED.

The Latest Novelty in Gas Lighting is the

PATENT INVERTED INCANDESCENT GAS BURNER.



One third full size.
Price: Burner with Mantle and Globe, $2.50.

No. 1 BURNER.

The most up-to-date and economical system of gas lighting, artistic in appearance, absolutely shadowless, and readily attached to existing fittings.

A BRILLIANT WHITE LIGHT OF 65 STANDARD CANDLE POWER.

Gas Consumption only 3 Cubic Feet per Hour.

The decorative appearance of Electric Light at one-eighth the cost.

THE "BIJOU" BURNER

Is the nearest approach to Electric Light, and lends itself more than any other gas burner to private house lighting, having an exceedingly pretty effect, especially when fixed in clusters of two, three or five lights.

20 standard candle power.

Consumption of Gas, 1 foot per hour.

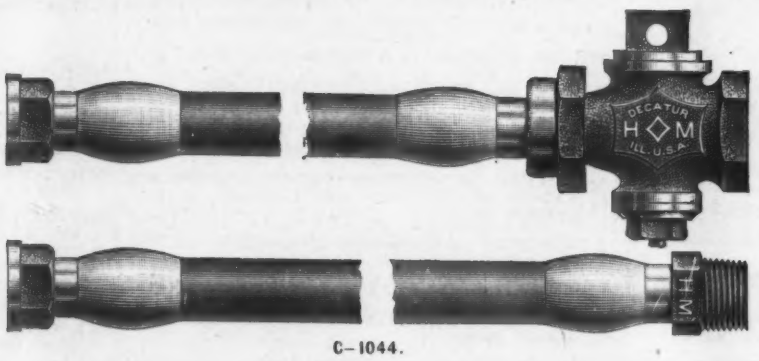
One-third full size.
Price: Burner with Mantle and Globe, $2.

The New Inverted Incandescent Gas Lamp Co., Ltd.,

GEO. G. RAMSDELL, Agent,

530 BROADWAY, - - NEW YORK.

MUELLER WIPED JOINT METER CONNECTIONS.



C-1044.

Making meter connections cheaply is a matter of men and equipment, and not men alone.

Mueller Wiped Joint Meter Connections are made in a factory equipped with automatic machinery for working the lead. They can be made much cheaper than those that are made in an improvised shop about the plant, where a man does all of the work by hand.

Mueller Wiped Joint Meter Connections are made in 220 sizes and specifications. The connections illustrated herewith have straight meter coupling on one end and a union meter cock on the other.

Each set of connections is given a test as nearly like actual service use as possible, bears the Mueller trade mark, and is *unconditionally guaranteed*.

We also make tapping machines and ground key cocks for gas works' use.

Mueller Meter Connections are on exhibit in the Palace of Manufactures, World's Fair.

H. MUELLER MFG. CO., DECATUR, ILL., U. S. A.

PARKER-RUSSELL MINING AND MFG. CO.,

OF ST. LOUIS, MO.,

PROPRIETORS OF THE

OAK HILL GAS RETORT AND FIREBRICK WORKS.

ST. LOUIS OFFICE: 417 Pine Street. NEW YORK OFFICE: Aldrich Court, 45 Broadway.

WE MAKE A SPECIALTY OF WATER GAS LININGS AND CHECKER BRICK.

Half and Full Depth Benches of Our Own Design, Containing 6, 8 or 9 Retorts.

SLOPERS.--We have perfected plans of INCLINED RETORT BENCHES, designed to meet conditions prevailing in America, and constructed entirely of American materials.

We Build Benches Complete. Ready for Gas Making. Also,

RETORT HOUSES,

COAL and COKE CONVEYING MACHINERY.

Plans, Specifications and Estimates Cheerfully Furnished.

CORRESPONDENCE SOLICITED.

ALL CONTRACTS MADE AS OF ST. LOUIS, MO.

FREDERIC EGNER,

Gas Engineer,

NORFOLK, VA.,

May be consulted with reference to estimates of cost for new, or appraising actual value of existing works; utility of proposed or patented processes; relative earning power to capitalization, and management.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

SCIENTIFIC BOOKS.

ELECTRIC GAS LIGHTING. By H. S. Norrie. 50 cents.

GAS ANALYST'S MANUAL. By J. Abady. $6.50.

COX'S GAS FLOW COMPUTER. $2.50.

FIELD'S ANALYSIS, 1903. $5.

GAS AND GAS WORKS. By Hughes and O'Connor. $2.

POOLE ON FUELS. By Herman Poole. $3.

GAS ENGINEER'S POCKET-BOOK. By Henry O'Connor $3.50.

TECHNICAL GAS ANALYSIS. By Winkler & Lunge. $4.

GAS CONSUMER'S HANDYBOOK, by Wm. Richards. 20 cents.

PRACTICAL TREATISE ON HEAT. By Thomas Box. 2d edition. $5.

PRACTICAL PHOTOMETRY: A Guide to the Study of the Measurement of Light. By W. J. Dibdin. $3.

CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.

IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.

HEMPEL'S GAS ANALYSIS, $2.25.

SELF-INSTRUCTION FOR STUDENTS IN GAS MANUFACTURE. $1.25.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.

PRACTICAL HANDBOOK ON GAS ENGINES, by G. Lieckfeld. $1.

HEAT A MODE OF MOTION. By John Tyndall. $2.50.

THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.

MANUAL FOR GAS ENGINEERING STUDENTS. By D. Lee. 40 cents.

AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2.

A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $3.

A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.

ILLUMINATING AND HEATING GAS. By W. Burns. $1.50

HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.

TREATISE ON MASONRY CONSTRUCTION. Baker. $5.

GAS ENGINEER'S LABORATORY HANDBOOK. By Jno. Hornby. $2.50.

FINANCES OF GAS AND ELECTRICITY MANUFACTURING ENTERPRISES. By Wm. D. Marks. $1.

PRACTICAL PLUMBING. By P. J. Davies. Vol. I. $3, Vol. II. $4.50.

AMERICAN PLUMBING. By Alfred Revill. $2.

A COMPARISON BETWEEN THE ENGLISH AND FRENCH METHODS OF ASCERTAINING THE ILLUMINATING POWER OF COAL GAS. $1.60.

ELECTRICITY.

INDUSTRIAL PHOTOMETRY, with Special Application to Electric Lighting. By A. Palaz, Sc.D. $4.

ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.

ELECTRIC TRANSMISSION OF ENERGY. By G. Kapp. $3.50.

ELECTRICIAN'S POCKET-BOOK. By Monroe and Jamieson. $2.50.

DYNAMO BUILDING. By F. W. Walker. 50 cents.

DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.

PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.

PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.

ELECTRIC LIGHTING, by Francis B. Crocker. $3

ELECTRIC LIGHT FITTING. $2.

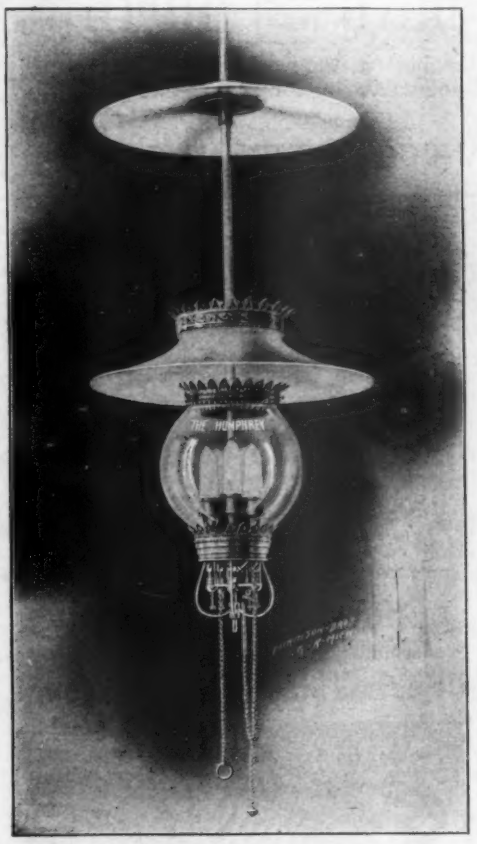
PRACTICAL ELECTRICITY. $2.50.

ELECTRICITY FOR ENGINEERS. $2.50.

ELECTRICITY, Its Theory, Sources and Applications. By John T. Sprague. $6.

The above will be forwarded upon receipt of price. If sent by mail or express, postage or express charges must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order. No books sent C.O.D.

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK.



THE HUMPHREY LIGHT is made in its entirety in our own shops.

Our lamp business is not a side issue jobbed out among various brass workers. We are the designers and makers of the original gas arc light.

GENERAL GAS LIGHT CO.,
KALAMAZOO, MICH.

54 Warren Street, New York.
530 Market Street, San Francisco.

ARTHUR R. CRUSE, President. FRANK FLAVELL, Secretary. AARON E. KEMPER, Treasurer.

Cruse=Kemper Company,

PHILADELPHIA OFFICES: Stephen Girard Building. - - WORKS: Ambler, Pa.

Manufacturers of

Triple, Double and Single=Lift Gasholders,

With or Without Metal Tanks,

Oil and Water Tanks, Purifier Covers, General Plate Metal Work, and Steel Water Towers.

Plans, Specifications and Estimates Promptly Furnished on Request.

COAL TAR AND AMMONIA.

THIRD AND ENLARGED EDITION.

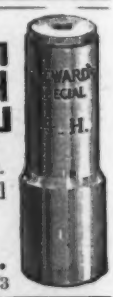
BY

GEORGE LUNGE, PH.D.

Price, $15. For Sale by

A. M. CALLENDER & CO., - - 42 Pine Street, New York City.

THERE IS NO PLACE LIKE HOME



For buying your burners. American material and American skill are equal to the best in the world in this line. Steward Burners are the best union jet checked burners that can be made. If you will write for samples we will include a sample cake of STAINOFF, free of charge.

D. M. STEWARD MFG. CO., Est. 1876, CHATTANOOGA, TENN., U. S. A.

T. PLANTINGA PRES. THE W.E. STEINWEDELL SEC.

GAS MACHINERY CO.,

MAIN OFFICE AND SHOPS

CLEVELAND, O.

N.Y. OFFICE 44 BROAD ST

J.A MAYERS
REPRESENTATIVE

COAL & WATER GAS APPARATUS,
PURIFIERS, VALVES,
CONNECTIONS,
ROTARY SCRUBBERS,
WASHERS,
BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.

PATENTS, TRADE-MARKS, COPYRIGHTS.

ROYAL E. BURNHAM,

Solicitor of Patents and Counsellor in Patent Causes.

833 Bond Building, Washington, D. C.

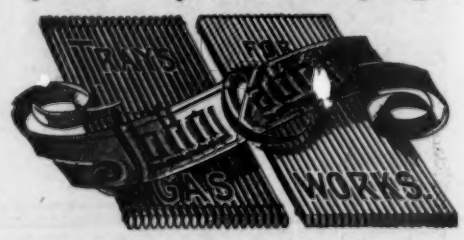
Send for Pamphlet on Patents.

1418-tf

Church's Patent Trays.

Reversible; Strongest; Most Easily Repaired.

Special Trays for Iron Sponge.



1412-1416 Adams Street, Hoboken, N. J.

We also Supply the Chapest and Strongest

•Reversible Bolted Trays•

IN THE MARKET.

SEND FOR BOOKLET AND CIRCULARS.

FIELD'S ANALYSIS FOR THE YEAR 1903.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the 35th year of publication. Compiled and arranged by JOHN W. FIELD, Sec'y and Gen. Mgr. of The Gas Light and Coke Company, London. Price, $5. For Sale by

A. M. CALLENDER & CO., 42 Pine St., New York City.

WHY ARE SO MANY GAS COMPANIES USING THE REEVES' ATTACHMENT?

INQUIRE OF THE

REEVES MFG. CO., - New Haven, Conn.

FRED. BREDEL, President. WM. O. VILTER, Vice-President. O. W. GREENSLADE, Secretary and Treasurer.

FRED. BREDEL COMPANY,

ENGINEERS AND BUILDERS OF GAS PLANTS.

Inclined Benches, own system, Recuperative Furnaces, Exhausters, Exhauster Governors, Condensers, Washers, Coolers, Wet Purifying Plants, Purifiers, Oxide Elevators, Hydraulic and Dry Coke Conveyors.

Special High Grade Material for Recuperative Furnaces.

Licensees for ARROLL-FOULIS Charging and Discharging Machines and FRONHAUSER Coke Conveyors. OFFICE, 405 KEENE ST., MILWAUKEE, WIS.

BRAY BURNERS

Are Used Everywhere,

Because they are the best.
Reliable absolutely.
Accurately marked.
You can't find a city in the world,
with gas, not using them.

All Bray Burners are stamped with Name and Trade Mark.
Refuse Imitations. Send for Blue Book.

WILLIAM M. CRANE COMPANY,

1131 & 1133 Broadway, New York City.

Hunt Coal Coke Handling Machinery.

Write for Catalogue.
C. W. HUNT COMPANY,
West New Brighton, N. Y.

THE
Ludlow Valve Mfg. Co.,
TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72"

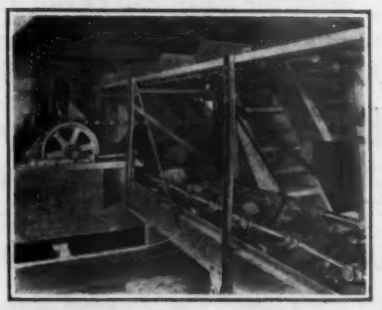
—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

Gravity Discharge Bucket Conveyor



delivering coal into Monobar Conveyor. (400-ton Locomotive Coaling Station erected for Ulster and Delaware R. R. Co., Rondout, N. Y.)

Link-Belt Conveyors provide successful methods of coal-handling in power houses, manufacturing and storage plants, etc. Write for literature.

LINK-BELT ENGINEERING COMPANY,
Philadelphia.

NEW YORK: 49 Dey Street.
PITTSBURG: Park Building.
CHICAGO: Link-Belt Machinery Co.

Do You Wish to Know

what size of pipe to use to convey any quantity of gas, any distance, with any loss of pressure and any initial or final pressure? Then use

Cox's Gas Flow Computer,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50.
For sale by

A. M. Callender & Co., 42 Pine St., N. Y.

Practical Handbook on
GAS ENGINES,
With Instructions for Care and Working of the Same,

By G. LIECKFELD, C.E.
Translated with Permission of the Author,
By GEO. M. RICHMOND, M.E.

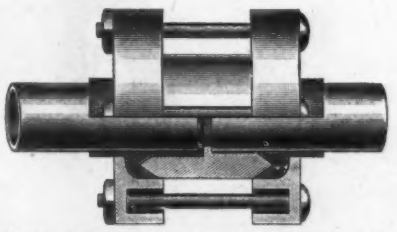
Price, $1. For Sale by
A. M. CALLENDER & CO.,
No. 42 Pine Street, New York City.

"THE MINER"
Globe
Street and Boulevard
Lamps.

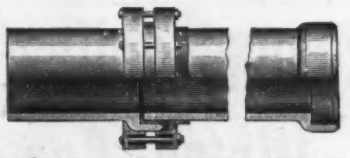
Cheapest and Best
THOUSANDS IN USE WITH INCANDESCENT BURNERS.
Send for Catalogues.

THOMAS T. W. MINER,
821-823 Eagle Av., N.Y.

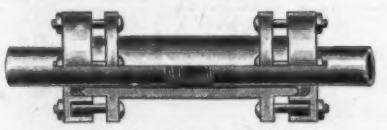
S. R. DRESSER,
BRADFORD, PENNSYLVANIA, U. S. A.,
Patentee and Manufacturer of Specialties for Oil and Gas Lines.



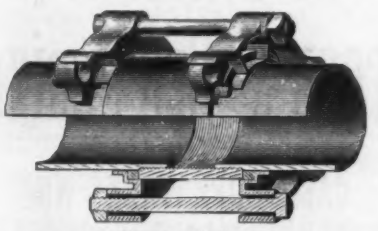
Insulating Coupling for Wrought Iron Pipe. Style 5.



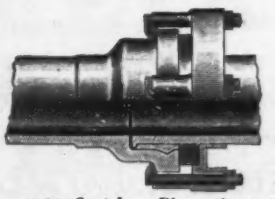
Insulating Coupling for Dresser Bell and Spigot Cast Iron Pipe. Style 6.



Regular Sleeve. Style 2.



Clamp. Style 4.



Clamps for Cast Iron Pipe. Style 4½.

Pipe Couplings, Sleeves, Clamps, Crosses, Tees and Ells.

My Insulating Coupling prevents the destruction of pipe by electrolytic action, in either water or gas lines.

SEND FOR CATALOGUE.

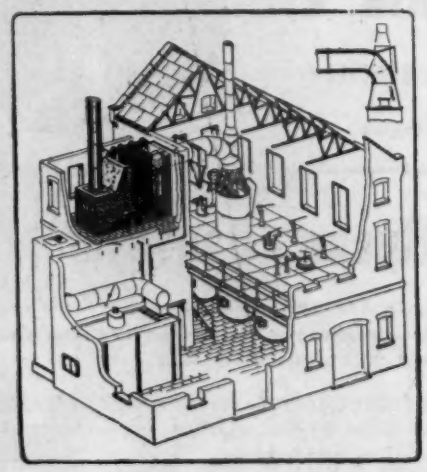
LLOYD CONSTRUCTION COMPANY,
DETROIT, MICH.

GAS WORKS BUILDERS.

Economize Heat in Water Gas Plants,

BY UTILIZING A

Green's Economizer,



To absorb the heat now going to waste when you blow through your superheater to heat the feed water for your boilers to the temperature of the steam. This is now being done at the Poughkeepsie Gas Works, Poughkeepsie, N. Y. : : : : :

Write for full particulars how this is accomplished, the saving effected, and the advantages gained, to the

GREEN FUEL ECONOMIZER CO.,
MATTEAWAN, N. Y.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE.

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,
238 Java Street, Brooklyn, N. Y.

GEORGE R. ROWLAND,
Formerly with the Continental Iron Works.
Draughtsman and Constructing Engineer.

Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.

Office, No. 245 Broadway, N. Y. City.

Bristol's Recording
PRESSURE GAUGE.

For continuous records of **Street Gas Pressure.** Simple in construction, accurate in operation and low in price.

Fully Guaranteed. Send for Circulars.

THE BRISTOL CO.,
Waterbury, Conn.

Silver Medal, Paris Exposition.

Gas Analyses of All Sorts and Conditions,
—OR—
Analyses of Solid and Liquid Materials as Well,

That are needed by Gas Companies at any time in the conduct of their business, may be obtained from

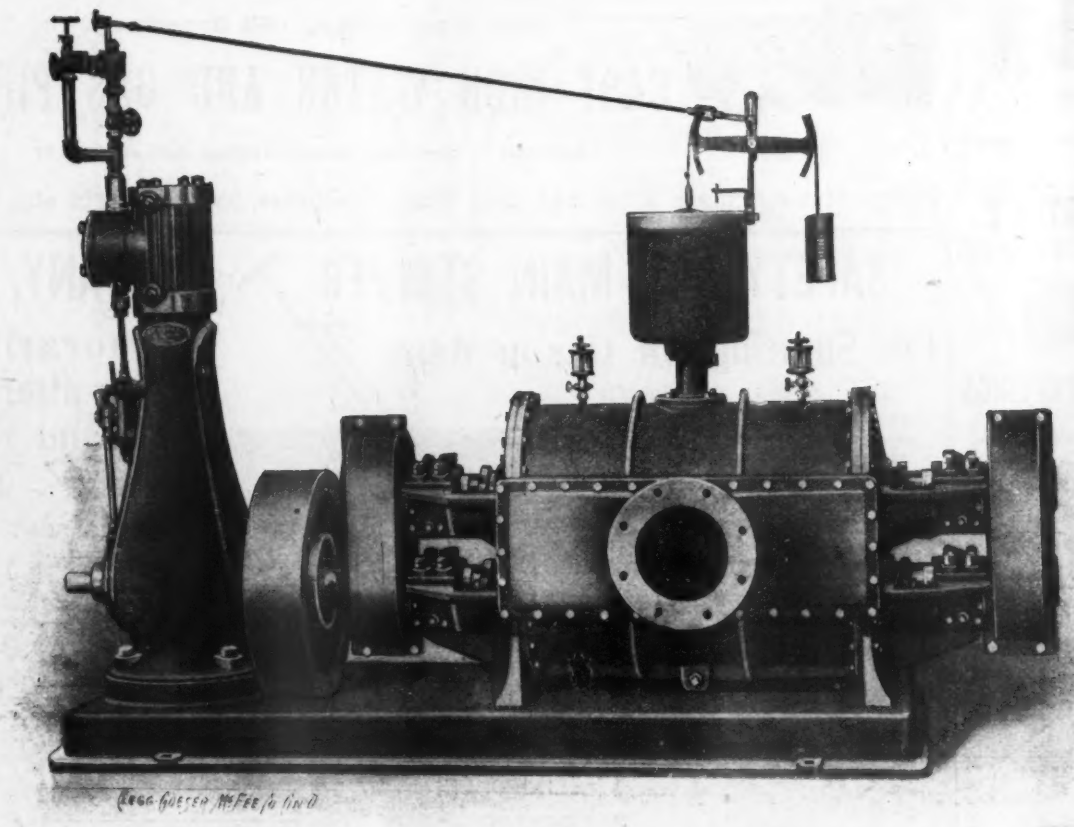
DR. W. H. BIRCHMORE,
1421-tf 341 ADELPHI ST., BROOKLYN, N. Y.

Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. **PRICE, $3.50.** For Sale by

A. M. CALLENDER & CO., 42 Pine St., N.Y. City.

ROOTS' GAS EXHAUSTERS.



Sizes for any required capacity.

Self-oiling, adjustable bronze bearings.

Most perfect and sensitive Governor.

Write for Catalogue.

P. H. & F. M. ROOTS COMPANY,

HOME OFFICE:
Connersville, Ind.

NEW YORK OFFICE:
120-122 Liberty St.

CHICAGO OFFICE:
1547 Marquette Bldg.

COX'S HIGH-PRESSURE FLUID DISCHARGE COMPUTER.

This Computer solves the following formula, which is applicable to Gas, Air and other elastic fluids, flowing through long pipes with high initial pressures:

$$\text{Discharge in cubic feet per hour at atmospheric pressure} = 33.3\sqrt{\frac{d^5 \times (p_1^2 - p_2^2)}{L \times w}}$$

Where d = diameter of pipe in inches,
p_1 = absolute initial pressure in pounds per square inch,
p_2 = absolute terminal pressure in pounds per square inch,
L = length of pipe in miles,
w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;
(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;
(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and
(4.) Opposite any desired discharge will also be found the required diameter of pipe.

Price of the Computers, in Cloth Case, 6½ x 8 inches, $5 Each, Net.

A. M. CALLENDER & CO., 42 PINE ST., N. Y.

PRACTICAL PHOTOMETRY,

A GUIDE TO THE STUDY OF THE MEASUREMENT OF LIGHT.

By WILLIAM JOSEPH DIBDIN.

With Numerous Illustrations. Price, $3.00.

A. M. CALLENDER & CO., 42 Pine Street, New York City.

"Globe Specials" "Elmoreal" Pipe Fittings

M. J. DRUMMOND & CO.

MANUFACTURERS OF

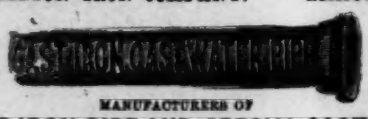
CAST IRON FLANGE GAS and WATER PIPE

GENERAL SALES OFFICE, 192 BROADWAY, NEW YORK.

GEORGE ORMROD, Mangr. & Treas., Emaus, Pa.
JOHN D. NALDSON, Prest., Betz Bldg. Phila. Pa.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.



MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, F c.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-Inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light, DAYTON, O.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS, SPECIFICATIONS AND ESTIMATES PREPARED.

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

THE

Valuation of Gas, Electricity and Water Works

FOR ASSESSMENT PURPOSES.

THOS. NEWBIGGING, M.Inst.C.E., and WM. NEWBIGGING, Assoc.M.Inst.C.E.

With an Appendix of Decided Cases.

Second Edition. Price $2. For Sale by

A. M. CALLENDER & CO.,
42 Pine Street, N. Y. City.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.

CAST IRON WATER AND GAS PIPE,

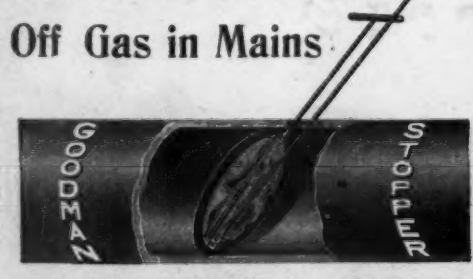
FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

SAFETY GAS MAIN STOPPER COMPANY,

For Shutting Off Gas in Mains

Any size gas main can be shut off in 30 seconds. : : :



Temporarily during alterations and repairs. : : : :

STOPPERS SENT ON TRIAL.

Address: SAFETY GAS MAIN STOPPER CO., 108 E. 117th St., New York City.

FOX HILL FOUNDRY,

F. FERGUSON & SON,

HOBOKEN, N. J.

FINE OPENING

GRATE BARS

FOR GAS WORKS.

STATIONARY, SHAKING, DUMPING.

BARS FOR HAZELTON BOILERS.

LINK-BELT

OPEN TOP CARRIER.

ESPECIALLY ADAPTED FOR HANDLING

Coal, Coke, Ashes, Stone, Ores,

Or any heavy or gritty materials, where strength and durabili y are essential. Constructed in any length or capacity, and to suit local conditions.

WRITE FOR CATALOG

The Link-Belt Machinery Co.

Link-Belt Engineering Co. Philadelphia Chicago, U.S.A.

GAS ANALYST'S MANUAL,

By JAQUES ABADY, M. Inst. Mech. E.

(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")

Ninety-three Illustrations and Nine Folding Plates. Bound in Handsome Half Leather. Price, $6.50.

For Sale by A. M. CALLENDER & Co., 42 Pine St., New York City.

ELECTRIC GAS LIGHTING.

How to install electric gas igniting apparatus, including the jump spark and multiple systems for use in houses, churches, theaters, halls, schools, stores or any large building. Also, the care and selection of suitable batteries, wiring and repairs.

By H. S. NORRIE.

Price, 50 Cents. Orders may be sent to

A. M. CALLENDER & CO., - - - 42 PINE STREET, NEW YORK CITY.

(Copyrighted, 1894, by the AMERICAN METER CO.)

AMERICAN METER CO.

ESTABLISHED 1836. INCORPORATED 1868.

NEW YORK,
PHILADELPHIA,
CHICAGO,
ST. LOUIS,
SAN FRANCISCO.

PUBLIC LIGHTING TABLE.

AUGUST, 1904.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. Extinguish.
				P.M.	A.M.
Mon.	1	7.40 PM	11.00 PM	7.10	3.30
Tue.	2	7.40	11.30	7.10	3.30
Wed.	3	7.40	12.00	7.10	3.30
Thu.	4	7.40 LQ	12.30 AM	7.10	3.30
Fri.	5	7.40	1.10	7.10	3.30
Sat.	6	7.40	2.00	7.10	3.45
Sun.	7	7.30	2.50	7.10	3.45
Mon.	8	7.30	4.10	7.10	3.45
Tue.	9	7.30	4.10	7.10	3.45
Wed.	10	7.30	4.10	7.10	3.45
Thu.	11	7.80 NM	4.10	7.10	3.45
Fri.	12	7.30	4.10	7.10	3.45
Sat.	13	7.30	4.10	6.55	4.00
Sun	14	7.30	4.10	6.55	4.00
Mon.	15	7.30	4.10	6.55	4.00
Tue.	16	9.20	4.10	6.55	4.00
Wed.	17	10.00 FQ	4.10	6.55	4.00
Thu.	18	10.40	4.10	6.55	4.00
Fri.	19	11.30	4.10	6.55	4.00
Sat.	20	12.20 AM	4.10	6.45	4.10
Sun.	21	1.10	4.20	6.45	4.10
Mon.	22	2.00	4.20	6.45	4.10
Tue.	23	3.00	4.20	6.45	4.10
Wed.	24	No L.	No L.	6.45	4.10
Thu.	25	No L. FM	No L.	6.45	4.10
Fri.	26	No L.	No L.	6.45	4.10
Sat.	27	7.10 PM	8.30 PM	6.30	4.20
Sun.	28	7.00	9.00	6.30	4.20
Mon.	29	7.00	9.30	6.30	4.20
Tue.	30	7.00	10.00	6.30	4.20
Wed.	31	7.00	10.30	6.30	4.20

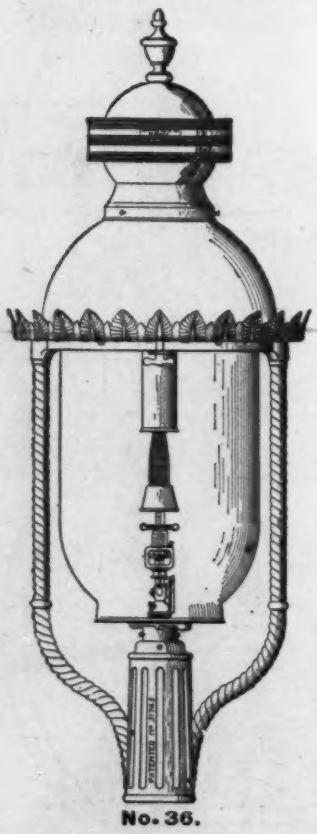
TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169.50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr	2171.40	Total, yr	4000.00

NEW YORK, 97 Liberty Street. BOSTON, 814 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, Foot of Orleans Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

AN underlying principle in business is to show an increase each year---to grow. The astute dealer not only seeks to retain this year's customers, but to attract new trade next year.

The formula is simple-

THIS SHIELD IS THE WELSBACH TRADE MARK.

IT IS A GUARANTEE AND A PROTECTION.

Sell The Welsbach Brands.

The imitation stuff is bad for the customer---which is bad for you.

The genuine Welsbachs---Burners or Mantles---make satisfied customers---keep customers---MAKE NEW ONES.

And your profit isn't merely dollars and cents.

WELSBACH CO.,

Broad and Arch Sts., PHILADELPHIA.

THE UNITED GAS IMPROVEMENT COMPANY

For the Year Ending December 31, 1903. has been Awarded Contracts in the Following Places for

Standard Double-Superheater Lowe Water Gas Apparatus.

Rochester, N. Y.	Chester, Pa.	Savannah, Ga.
Baltimore, Md.	Lynn, Mass.	New York (Central Union Co.)
Chicago, Ills.	Newark, N. J.	Cicero, Ills.
Amesbury, Mass.	Washington, D. C.	Chicago (Ogden Co.)
Aberdeen, S. D.	Boone, Ia.	Easton, Pa.
Winsted, Conn.	Pueblo, Col.	Lawrence, Mass.
Canon City, Col.	Charlotte, N. C.	Council Bluffs, Ia.
Schenectady, N. Y.	Fall River, Mass.	Chattanooga, Tenn.
Hagerstown, Md.	Duluth, Minn.	Tuckerton, N. J.
Malden, Mass.	New York (Mutual Co.)	Springfield, O.
Bridgeport, Conn.	Waltham, Mass.	Easton, Pa. (2d contract).
Albert Lea, Minn.	Dover, Del.	Mobile, Ala.
Brooklyn, N. Y.	York, Pa.	Conshohocken, Pa.
Kansas City, Kas.	Minneapolis, Minn.	Mason City, Ia.
Hempstead, N. Y.	Allentown, Pa.	

TOTAL SETS FOR 1903, ... 62
TOTAL DAILY CAPACITY, ... 62,950,000 cubic feet.
TOTAL SETS TO DATE, ... 508
TOTAL DAILY CAPACITY, ... 362,780,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES,
FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
88 VAN DYKE ST., BROOKLYN, N. Y.
MANUFACTURERS OF

CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

Established 1854. Incorporated 1869.

LACLEDE
Fire Brick Manufg. Co.,

Manufacturers of { GAS RETORTS . .
FIRE BRICK . . .
RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

Proprietors for the U. S., Coze System of Inclined Benches.

Estimates Furnished on Application for Most Successful Style of Construction.

Also for Free-Firing and Full and Half-Depth Regenerative Benches, for Burning either Coal or Coke in the Furnaces.

Office:
Cor. Manchester and Sulphur Avenues, St. Louis, Mo.

Established 1845. Reorganized 1902.

The Kreischer Brick Mfg. Co.,

Manufacturers of the very best quality of Clay Retorts, Blocks, Tiles, Settings and Firebrick of every description.

Also Miners and Shippers of Fireclay, Fire Sand, Ground Brick in Barrels.

WORKS: KREISCHERVILLE, STATEN ISLAND.
OFFICE: 119 E. 23D STREET, NEW YORK CITY.

Adam Weber Sons.

GENERAL OFFICES: Park Row Bldg., N. Y. City.
DEPOT & WAREHOUSES: 639 E. 15th St., N. Y. City.
WORKS: Weber, N. J.

ERECTION OF

Modern Coal Gas Plants,

With either Horizontal, Inclined or Vertical Retorts.

PATENTS APPLIED FOR.

No. 1. Firing horizontal benches with pulverized fuel, with either 8 or 10 retorts in 1 setting, using one furnace for two benches. Great saving in labor, fuel and life of retorts and settings. No elaboration of complex recuperation.

No. 2. Independent retort settings, taking all weight from retorts.

No. 3. Vertical retorts with vertical charge and discharge. Sixteen retorts in one bench.

MODERN IRONWORK.

ISAAC C. BAXTER, President.
Works.
LOCKPORT STATION, PA.

ESTABLISHED 1864.

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

PETER YOUNG, Sec'y and Treas.
Address all communications to
JAMES GARDNER, JR., CO., Room 202 Lewis B'l'd'g.
PITTSBURGH, PA.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,
BENCH SETTINGS,
Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. BLOOMINGTON, INDIANA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD, BLOOMINGTON, IND.

For orders East of Buffalo, N. Y., or Pittsburg, Pa., freight will be paid to these points.

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

For Sale by

A. M CALLENDER & CO., 42 Pine Street, New York City.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec.
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE
RETORT & FIRE BRICK CO.

MANUFACTORY AT
LOCUST POINT, BALTIMORE, MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY,
AND FIRE CEMENT.

Our Improved Half and Full Depth Benches have been Adopted by Many Gas Companies.

WALDO BROS., 102 MILK ST., BOSTON, MASS.

Sole Agents for New England States.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office:
411 Olive Street,
Continental Bank,
ST. LOUIS, MO.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y. Toronto and Montreal, Canada.

Four-Scoop and Four-Rake Charging and Discharging Machines are being furnished for Detroit, Mich.

These are the only machines that will draw or charge simultaneously three or four retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Can., working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

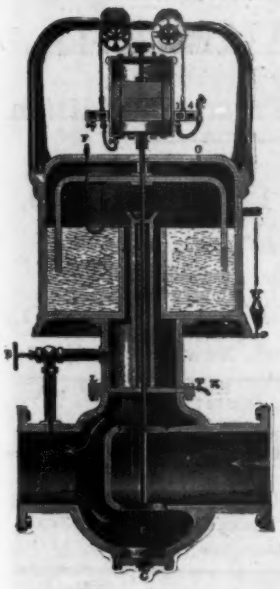
Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

G. A. BRONDER,
Contracting Engineer and Builder,

229 BROADWAY. NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,

CONSTRUCTORS OF



Coal Gas Apparatus.

Automatic, Balance and Service Gas Governors.
Roots Improved Gas Exhausters.
Iron Sponge for Gas Purification.
Jones Jet Photometers, Pressure Registers, etc.

GAS SPECIALTIES.

395 Broadway, New York. 788 South Canal St., Chicago, Ills.

PRACTICAL PHOTOMETRY,

By WILLIAM JOSEPH DIBDIN,

PRICE, $3. FOR SALE BY

A. M. CALLENDER & CO., 42 Pine Street, New York City.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C.

Price, $2.50.

A. M. CALLENDER & CO., 42 Pine St., N. Y. City

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

TIDEWATER SALES AGENTS FOR THE FOLLOWING:

Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

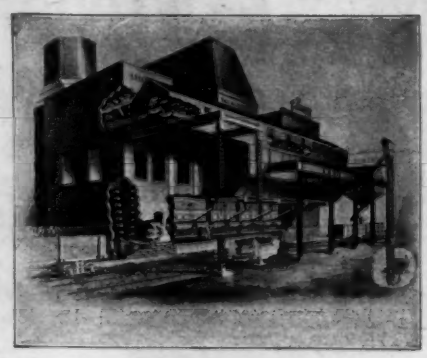
Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming. .

A. C. M. AZOY, General Agent, 1 Broadway, New York.

THE OLD WAY of COAL AND ASH HANDLING
IS BEING
SUPPLANTED BY JEFFREY MACHINERY,

DUMP CARS for ASHES,
ELEVATORS AND CONVEYORS for COAL,
ELEVATING, CONVEYING, POWER TRANSMITTING MACHINERY,
Elevator Buckets,
CHAINS of ALL KINDS.



Which REDUCES LABOR TO A MINIMUM and LESSENS EXPENSE.
CABLE, SPIRAL & RUBBER BELT CONVEYORS.
Coal and Coke Crushers.
SCREENS of ALL KINDS.

COAL storage capacity, 1,000 tons.

Catalogues on all lines sent postpaid.

THE JEFFREY MANUFACTURING CO.,
COLUMBUS, OHIO, U. S. A.,
New York, Pittsburg, Chicago, Denver, Charleston, W. Va.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C. Price, $3.50,

Orders may be sent to

A. M. CALLENDER & CO., 42 Pine St., N. Y.

COAL TAR
— AND —
AMMONIA.

Third and Enlarged Edition.

BY
GEORGE LUNGE, Ph.D.

Price, $15. For Sale by
A. M. CALLENDER & CO.,
42 Pine Street, New York City.

SELF-INSTRUCTION
For Students in Gas Manufacture.

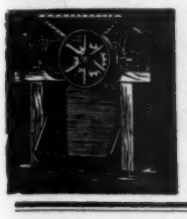
Price, $1.25. For Sale by
A. M. Callender & Co.,
42 Pine Street, New York City.

ELECTRIC GAS LIGHTING.

How to install electric gas igniting apparatus, including the jump spark and multiple systems for use in houses, churches, theaters, halls, schools, stores or any large building. Also, the care and selection of suitable batteries, wiring and repairs.

By H. S. NORRIE.

Price, 50 cents. Orders may be sent to
A. M. CALLENDER & CO., 42 PINE ST., N. Y. CITY.



KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

POOLE ON FUELS.

THE CALORIFIC POWER OF FUELS.

By HERMAN POOLE, F.C.S.

Second Edition. Price, $3. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., N.Y. CITY.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C.

Price, $2.50.

FOR SALE BY

A. M. CALLENDER & CO,

42 Pine Street, New York City.

BINDER for the JOURNAL.

Price, $1.00.

A. M. CALLENDER & CO., 42 Pine Street, N.Y.

EDMUND H. McCULLOUGH, President. CHAS. F. GODSHALL, Treasurer. H. C. ADAMS, Secretary. HENRY WHARTON, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

SUN COMPANY,

PRODUCER, REFINER, SHIPPER AND EXPORTER OF
Petroleum and All Its Products.

Pittsburg, Pa., and Philadelphia, Pa.

THE SUN OIL CO.

Gas Oil, Gas Naphtha,
Refined Oil, Lubricating Oils.

Toledo, O., and Pittsburg, Pa.

FERROINCLAVE FIREPROOF ROOFING.

Light, Cheap, Not Injured by Steam or Sulphurous Gases.

DESCRIBED IN OUR FERROINCLAVE PAMPHLET.

The Brown Hoisting Machinery Co.,

New York. Cleveland. Pittsburg.

PRACTICAL HANDBOOK ON

GAS ENGINES,

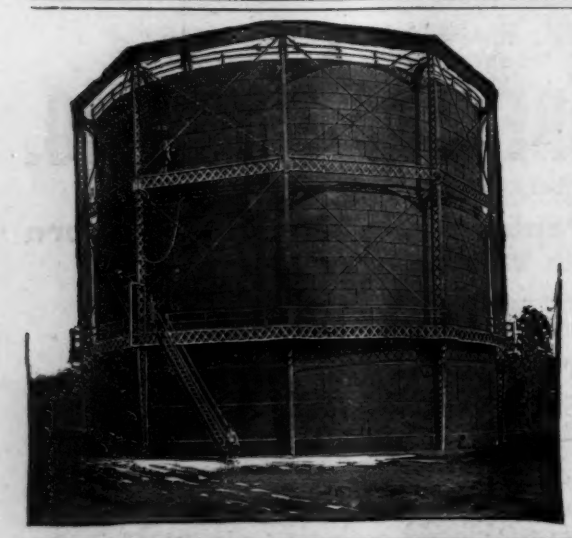
With Instructions for Care and Working of the Same.

By G. LIECKFELD, C.E.

Translated with Permission of the Author, by GEO. M. RICHMOND, M.E.

PRICE, $1.00.

A. M. CALLENDER & CO., 42 Pine Street, New York City.



DAVIS & FARNUM MFG. CO.,

WALTHAM, MASS.

Principal Office & Works, Waltham, Mass. Boston Office, R'm 18, Vulcan Bldg., 8 Oliver St.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

BAXTER & YOUNG,

CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

GAS PROPERTIES PURCHASED.

OFFICE: WAYNE COUNTY BANK BUILDING,

Rooms 201 & 202. DETROIT, MICH.

A. E. BOARDMAN, C. E.,

Consulting and Contracting Engineer.

Particular attention given to Gas, Water and Electric Plants. Long and successful experience with the problem and practice of

Filtration for Public Water Supply.

Edison Building, 42 and 44 Broad St.,

NEW YORK CITY.

DAVID LEAVITT HOUGH,

Consulting Engineer

AND

CONTRACTOR,

PARK ROW BUILDING, N. Y.

Geo. Shepard Page's Sons.

GAS MACHINERY.

Correspondence Solicited.

180 Fulton Street, New York City.

Established 1876.

National Paint Works.

PAINTS FOR METAL SURFACES.

We Sell 65 Per Cent. of the Gasholder Paint in the United States.

SALES OFFICE:	FACTORY:	SALES OFFICE:
Great Northern Bldg., Chicago.	Williamsport, Pa.	92 William Street New York City.

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

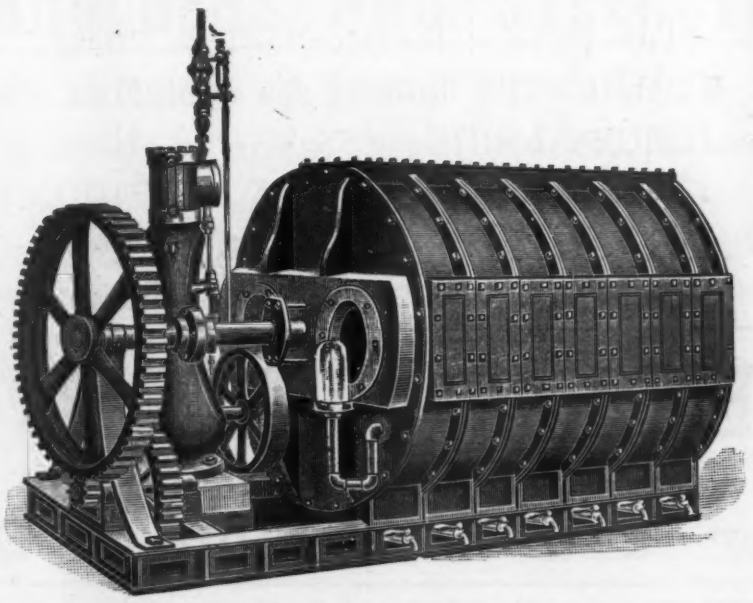
ADDRESS:

KERR MURRAY MANUFACTURING COMPANY, { FORT WAYNE, IND.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Designers and Builders of Gas Works.



Sole Lessees the Wilkinson Water Gas Process.

PATENT STANDARD WASHER-SCRUBBER.

The best apparatus for the extraction of all Ammonia and a large proportion of Carbonic Acid and Sulphureted Hydrogen. The Scrubber has been materially improved and is provided with patented Wooden Segmental Grids, instead of Metallic Discs, thus reducing the weight on shaft and power for operating same.

Coal and Water Gas Installations of the Most Modern and Complete Types.

BENCHES WITH INCLINED RETORTS.

System Stettiner Chamotte Fabrik, Actien Gesellschaft, of Stettin, Germany.

GASHOLDERS OF ALL SIZES.

General Western Agents, THE LLOYD CONSTRUCTION CO., of Detroit, Mich.

QUINTARD IRON WORKS,

N. F. PALMER,

Foot of 12th St. & East River, New York,

MANUFACTURERS OF

GAS APPARATUS.

Complete Works Erected.

FREDERICK W. FLOYD, Engineer.

ALEX. C. HUMPHREYS, M.E., M. Inst. C.E. ARTHUR G. GLASGOW, M.E., M. Inst. C.E.

HUMPHREYS & GLASGOW,

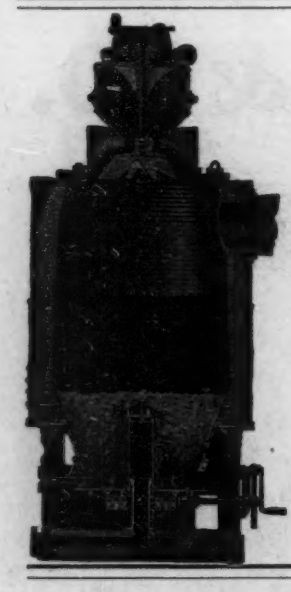
BANK OF COMMERCE BLDG., 31 Nassau Street, New York.

38 VICTORIA STREET, London S.W., England.

CONSULTING GAS AND ELECTRIC LIGHT ENGINEERS.

PROPERTIES PURCHASED.

COMPLETE EXAMINATIONS MADE.



R. D. WOOD & CO.,

400 CHESTNUT STREET, PHILADELPHIA,

—BUILDERS OF—

Gas Power Plants with Producers,

The best Producers for either Bituminous, Anthracite Coal or Lignite. Less labor required and less waste than in any other Producer. Send for Pamphlet. : : : :

CAST IRON PIPE.

HYDRAULIC TOOLS. HYDRAULIC OPERATING VALVES.

ISBELL-PORTER CO.,

ENGINEERS AND CONTRACTORS FOR THE

Construction and Extension of Gas Works.

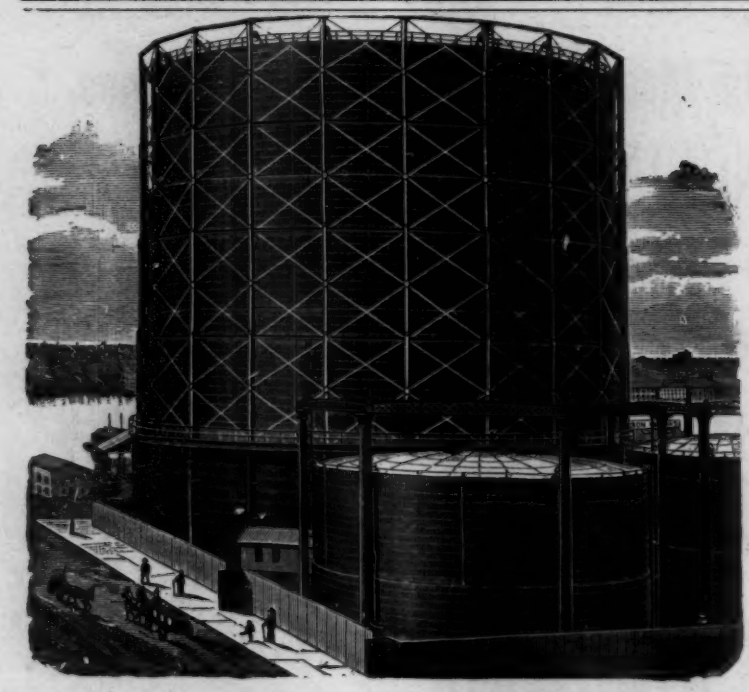
TOTAL ROTARY AMMONIA SCRUBBERS SOLD,

98,806,000 Cu. Feet Daily Capacity.

TOTAL WALKER TYPE TAR EXTRACTORS SOLD,

34,900,000 Cu. Feet Daily Capacity.

OFFICE AND WORKS: Bridge and Ogden Streets, Newark, N. J.



The Continental Iron Works,

THOMAS F. ROWLAND, President.
WARREN E. HILL and CHAS. H. CORBETT, Vice-Presidents.
THOMAS F. ROWLAND, Jr., Secretary & Treasurer.

West and Calyer Sts. (Near 10th & 23d St. Ferries)
NEW YORK, Borough of Brooklyn.

BUILDERS OF

Gas Holders.

Single and Multiple Section Gas Holders a Specialty.

STEEL GAS HOLDER TANKS.

BENCH CASTINGS, RETORT LIDS.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, Etc.

Self-Sealing Retort Mouthpieces & Lids

For Round, Oval, or "D" Retorts.

THE GAS ENGINEER'S LABORATORY HANDBOOK,

By JOHN HORNBY, F.I.C.

PRICE, - - - - - - - $2.50.

A. M. CALLENDER & CO., No. 42 Pine Street, New York City

THE STACEY MANUFACTURING COMPANY,

MANUFACTURERS AND BUILDERS OF

GASHOLDERS AND STEEL TANKS

AND ALL IRONWORK AND MACHINERY REQUIRED IN A GAS PLANT.

Also Oil Storage Tanks, Steel Roofs, Stand Pipes, Etc.

We also manufacture Lamp Posts, Gas Valves, all size and shape Castings, Etc.

The only authorized manufacturers of "THE CHOLLAR SYSTEM OF GAS PURIFICATION."

Plans, Specifications and Estimates Cheerfully Furnished on Request.

GENERAL OFFICES:

No. 239 Mill Street, CINCINNATI, OHIO. 'Phone, West 690.

EASTERN SALES AGENT:

FRANK D. MOSES, 7 North Stockton Street, TRENTON, N. J.

RITER-CONLEY MFG. CO.,

GASHOLDERS, with or without Steel Tanks.

Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks.

STEEL ROOFS and BUILDINGS.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

GENERAL OFFICE: Pittsburg, Pa. EASTERN OFFICE: 39-41 Cortlandt St., New York City.

WM. HENRY WHITE,

EDISON BUILDING, No. 44 BROAD STREET, = = = NEW YORK CITY,

ENGINEER AND CONTRACTOR FOR THE

ERECTION AND EXTENSION OF

GAS, WATER, AND ELECTRIC LIGHT WORKS.

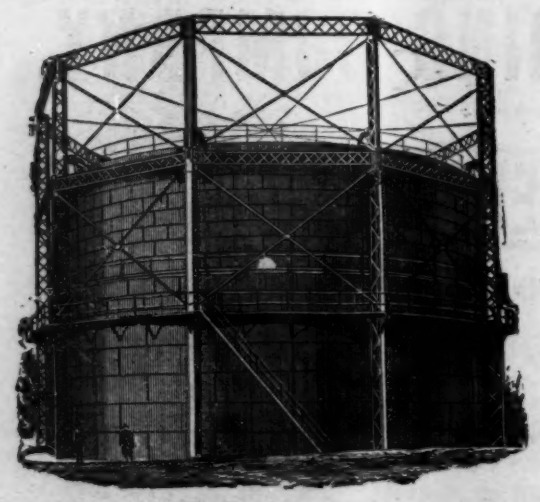
Correspondence with Gas Companies contemplating extending or improving their Plants respectfully invited.
Plans and Estimates Furnished.

1904 DIRECTORY 1904

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - - $5.00.

A. M. CALLENDER & CO., - - No. 42 Pine Street, New York.



1842 ※ Deily & Fowler, ※ 1904

LAUREL IRON WORKS.

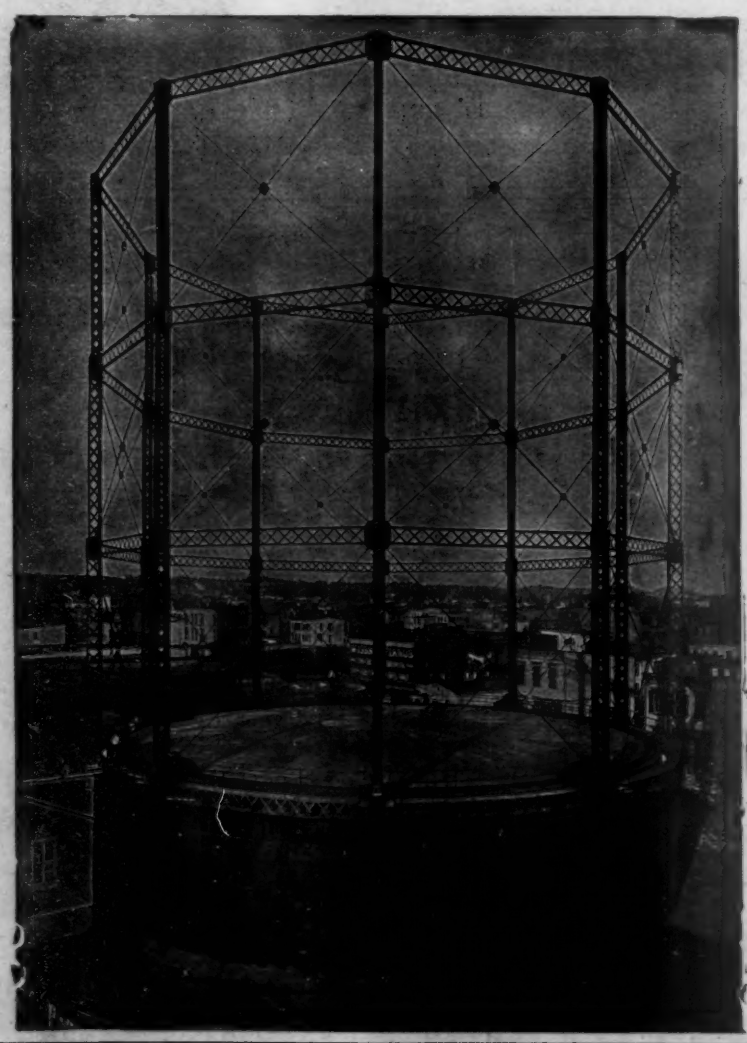
Office, No. 39 Laurel Street, Philadelphia, Pa.

BUILDERS OF

Gasholders

Single or Telescopic. With or Without Iron or Steel Tanks.

OIL TANKS, WATER TANKS, AND GENERAL WROUGHT IRON WORK.



The order for this Triple-Lift Holder and Steel Tank was received by the Logan Iron Works from the Union Gas Light Company, of East New York. The contract was completed and the Holder was in actual use in 90 days from receipt of order. Capacity of Holder, 500,000 Cu.Ft.

LOGAN IRON WORKS,

Brooklyn, N. Y.,

MANUFACTURERS OF

Single or Multiple-Lift

GASHOLDERS,

Complete, with Steel Tanks.

BENCHES, SCRUBBERS,
CONDENSERS,
PURIFIERS, IRON ROOFS,

AND ALL PARTS OF

GAS WORKS APPARATUS.

Contractors for Complete Works.

Gas Analyst's Manual,

By JAQUES ABADY, M. Inst. Mech. E.

(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")

Ninety-three Illustrations and Nine Folding Plates.
Bound in Handsome Half Leather. Price, - $6.50.

FOR SALE BY

A. M. CALLENDER & CO., - - 42 Pine Street, New York City.

Established 1854.

D. McDONALD & CO.,

MANUFACTURERS OF

WET AND DRY METERS, STATION METERS AND METER PROVERS.

ALSO MAKERS OF

THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES

OVER 120,000 OF THESE METERS,

ALL OF WHICH ARE GIVING PERFECT SATISFACTION.

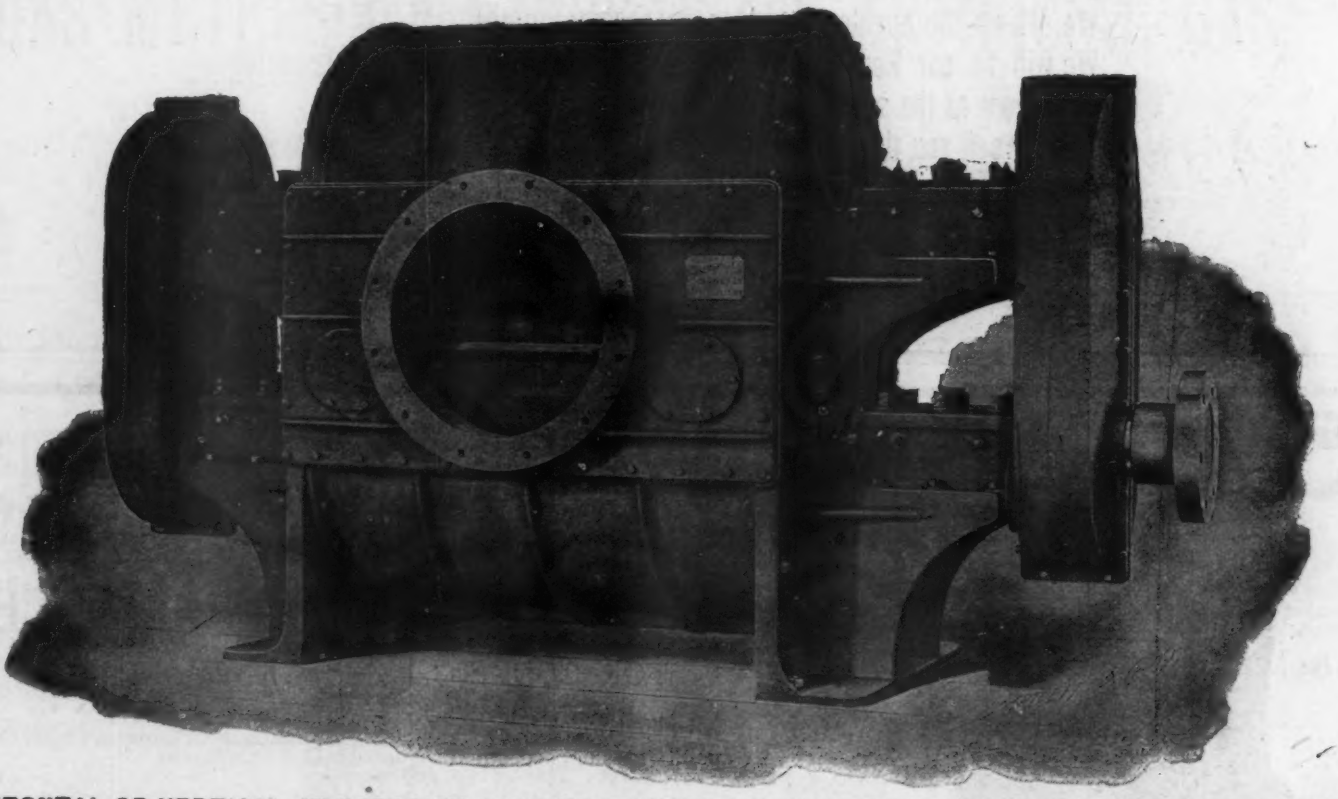
Correspondence Solicited.

561 West Forty-seventh Street, NEW YORK. | 51, 53 & 55 Lancaster Street, ALBANY, N. Y. | Jefferson and Monroe Streets, CHICAGO.

THE CONNERSVILLE BLOWER CO.,

MANUFACTURER OF

ROTARY POSITIVE PRESSURE GAS EXHAUSTERS, BLOWERS AND PUMPS.



HORIZONTAL OR VERTICAL, IN CAPACITY RANGING FROM 9,000 to 1,800,000 CU. FEET DISPLACEMENT PER HOUR.

CONNERSVILLE BLOWER CO., Connersville, Ind. EASTERN SALES OFFICE: 95-97 Liberty St., New York City.

We Have Sold Over 50,000 of Our

PREPAYMENT GAS METERS

IN NEW ENGLAND.

We Have Fitted Up Over 10,000 Idle Regular Meters with Our

PREPAYMENT ATTACHMENT.

Can be Attached to Any Make of Meter.

NATHANIEL TUFTS METER COMPANY, 8 MEDFORD STREET, BOSTON, MASS.

MARYLAND METER CO.,

BALTIMORE, North and Saratoga Streets. CHICAGO, 88 to 92 Jackson Boulevard.

CONSUMERS' AND STATION METERS, PRESSURE GAUGES, ETC.

SPECIAL ATTENTION GIVEN TO ALL REPAIR WORK.

"Have you Seen our Complaint Meter?"

THE PREPAYMENT.

We offer a thoroughly first-class prepayment meter.
We will fit our Reeves Attachments to your regular meters, repairing them at the same time if necessary.
We will sell you the Attachments, and you can put them on.
Which will you have?

KEYSTONE METER CO., Royersford, Pa.

DETROIT STOVE WORKS

"Largest Stove Plant in the World"

MANUFACTURES AND SELLS

DETROIT JEWEL GAS APPLIANCES

FOR COOKING and HEATING,

All about which is told in a fine and strictly "to-the-point" catalog, sent upon request to Gas Companies.

DETROIT, MICH. CHICAGO, ILLS.

AMERICAN METER COMPANY,

NEW YORK, PHILADELPHIA, CHICAGO.
SAN FRANCISCO, ST. LOUIS.

PREPAYMENT METERS.

THEIR CONSTRUCTION IS SUCH THAT THEY MAY BE READILY READJUSTED WHEN THE SCALE OF GAS RATES IS CHANGED.

HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

EXCERPTS FROM DECISIONS

—OF THE—

BOARD OF GAS COMMISSIONERS of the COMMONWEALTH OF MASSACHUSETTS.

MR. E. H. YORKE, NEW HAVEN, CONN., Dec. 1, 1898.

Dear Sir:—I am in receipt of a copy of "Excerpts from the Decisions of the Board of Gas Commissioners," which is a handy compilation in book form of extracts from the most recent decisions of the Gas Commission of Massachusetts.

I note that most of these extracts are broad and safe-guiding precepts, which apply with equal force to one Company as to another. The 13 years' existence of the Board of Gas Commissioners with its unusual opportunities for acquiring information, have justly made it a high and safe authority in all matters pertaining to the management, obligations, and rights of Gas Companies. Your little book will serve as a valuable reference library in settling legal complications which often arise between a Gas Company and its customers.

Yours truly, (Signed) F. C. SHERMAN, Superintendent.

A 28-page Pamphlet containing the cream of this Board's decisions as to the proper management of Gas Companies.

Compiled by E. H. YORKE. Price $1.00. Address

A. M. CALLENDER & CO., - No. 42 Pine Street, New York

JOHN J. GRIFFIN & CO.,

1513 TO 1521 RACE STREET,

559 West 47th Street, NEW YORK.

PHILADELPHIA.

Jefferson and Monroe Streets, CHICAGO.

MANUFACTURERS OF

GAS METERS,

Station Meters and Experimental Apparatus of Every Description.

PROMPT ATTENTION GIVEN TO ALL REPAIRING.

OUR SPECIAL NATURAL GAS METER

Is the Best ever offered. Over 75,000 now in use.

The Positive Prepayment Meter.

Positive Advantages:

The Income is Quick and Sure.

IT IS

Better than C.O.D.,

As Gas is Paid for Before Delivery. : : :

There is Money in it ☞

For the gas man.

IT WILL GET NEW CUSTOMERS.

It will KEEP the ones you have.

Negative Advantages:

No "Deposit" is Necessary to Start Business with a new customer. : : :

NO CUSTOMERS ARE LOST on that account.

No Time Lost Making Out Bills.

No Money Lost on account of Unpaid Bills. :

No Disputes on Account of Bills.

THE PREPAYMENT SYSTEM IS PROFITABLE FOR THE GAS MAN AND PLEASANT FOR THE CONSUMER.

OVER 125,000 OF THE POSITIVE PREPAYMENT METERS ARE IN USE IN THE UNITED STATES.

SEND FOR OUR BOOKLET.